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Steel Car Design from the Painter's Viewpoint

In the design of all-steel equipment for both passenger and freight service the engineer has of necessity carefully considered the details from a practical construction standpoint. The painter whose most important duty is to protect the steel equipment from corrosion, in addition to providing a neat and pleasing appearance, finds by sad experience that he is severely handicapped by details of construction that had proved entirely satisifactory in the wooden equipment. This was clearly brought out during the recent convention of the Master Car and Locomotive Painters' Association, a report of which is printed elsewhere in this issue. Attention was called to many details that should receive more careful attention in this respect. Every effort should be made to secure maximum life from the steel equipment, and here the master painter with his knowledge and experience can be of material assistance to steel car designers.

Railway Returns for the Fiscal Year

The drastic economies to which the railways have been driven recently are clearly reflected in the Interstate Commerce Commission's compilation of the returns for Class I roads for the fiscal year, which were reported in last week's issue, page 539. These are roads earning $1,000,000 gross or more. Their total operating revenues were $163,404,055 less than for the year 1914, which also showed a decrease of $65,691,076 as compared with 1913. The managements were able, however, to reduce operating expenses by $186,244,099, and taxes declined $2,765,192, leaving a net gain of $24,991,787, or 2.6 per cent per mile in (net) operating income. It should be noted that this gain is to be compared with the results of a year in which there was a decrease of $118,657,668 in (net) operating income. Reduced to a mileage basis, the decrease in total revenues was 6.3 per cent, while operating expenses were reduced 9.3 per cent, and the increase of net operating revenues was 1.8 per cent. Freight earnings per mile were reduced from $9,200, in 1914, to $8,701, in 1915; passenger earnings from $3,038 to $2,757, and express earnings from $960 to $302. The reduction in operating expenses per mile was from $9,801 to $8,894, or $907, of which $449 was in transportation expenses, $209 in maintenance of way and structures and $177 in maintenance of equipment. The saving in transportation is, of course, a real saving, but as nearly half of the total reduction in expenses was effected in the maintenance accounts it is to be feared that much of the small improvement in net for the year was gained only by deferring many needed expenditures on roadway and equipment to some future date. The increases in net operating revenue are entirely attributable to the more favorable showing of the Eastern roads in 1915 than in 1914. The Western and Southern groups of lines show decreases both in total and in net operating revenues in spite of reductions in operating expenses. The relatively more favorable showing of the gross and net earnings of the Eastern roads was partly due to the fact that the advances in freight rates allowed by the Interstate Commerce Commission in the five per cent case were in effect a part of the year.

Trespassing Accidents Still Increase

In a recent issue the *Railway Age Gazette* called attention to the fact that while the number of passengers and employees killed by our railways is showing a very gratifying reduction in recent years, the number of trespassers killed, which for the last 25 years has averaged 53 per cent of all persons killed by railways, continues to increase. The accident bulletin just issued by the Interstate Commerce Commission for January, February and March of this year, and the bulletin for the preceding quarter, show that during the last six months for which the figures are available the proportion of trespassers killed was even greater than it has been in the past. For the six months the two bulletins report a total of 3,662 persons killed in all kinds of accidents, exclusive of industrial accidents; and of these 2,165, or *nearly* 60 *per cent,* were trespassers. During the same time only 79 passengers and 908 employees were killed, and only 424 persons other than trespassers were killed at grade crossings. In train accidents only 14 passengers and 106 employees were killed, while only one passenger in each quarter was killed in a collision, making only two in six months. During this period the number of passengers carried one mile was approximately 17,629,000,000. Collision accidents are those the public hears most about; but at this rate the average passenger could travel continuously at a speed of 60 miles an hour for 16,770 years before meeting death

in a collision! Our statute books contain a mass of legislation designed to prevent accidents to passengers and employees, and at grade crossings, but the railways cannot secure the enforcement of what meager laws there are to prevent trespassing, although in six months 32 times as many trespassers as passengers, over twice as many trespassers as employees, and five times as many trespassers as persons at grade crossings, were killed. Most of our safety legislation is directed against train accidents or defects of equipment. It seems to take little cognizance of the human element. Yet in six months only 143 persons were killed in train accidents, while no less than 3,262, or 89 per cent of the total, were killed by falling from cars or engines, while getting on or off cars or engines, or by being struck or run over by engines or cars at stations, yards, highway grade crossings or at other places. In other words, these accidents were largely attributable to carelessness or willingness to take a chance on the part of the victims themselves.

INTERMINABLE LITIGATION AND HAIR-SPLITTING

Woe unto you——! for ye tithe mint and anise and cummin, and have left undone the weightier matters of the law; justice, mercy, * * *.—Matthew, chap. 23, verse 23.

IT is some little time now since the editorial matter in the *Railway Age Gazette* has been so distinctively scriptural as to call for the introduction of this old custom of putting a text, verbatim, at the head of the column; but the appositeness of these words of the Son of God appears nowadays with such painful frequency in the court news column, and elsewhere in railway transactions, that we make no apology for thus reverting to fundamental truth.

One question alone, that of whether, in a given freight-car movement, an employee is or is not engaged in interstate commerce is the cause of an immense amount of hair-splitting. It must have afforded hundreds of days' work for the lawyers and the judges during the past few years; and this question, in relation to the hours of service law, is now being superseded, as a main item on the daily menu of legal news, by the same question as related to the law concerning liability for damages for bodily injury. And in connection with this last feature the liability laws of individual states are undergoing such an interminable succession of changes that the crop of lawsuits seems likely to keep up forever.

In our issue of August 27, page 406, the records tell how the courts of three states, New Jersey, Illinois and Kentucky, wrestled with such vital questions as whether a man going to repair a whistle rod on a switching engine is engaged in interstate commerce; the same question as to a boy who built fires in engines, but who assisted in moving an engine for the purpose of getting a barrel of oil, which was to undergo the very irregular process of being transported in interstate commerce on a locomotive; and a third question which is of similar character, but which we should not want to try to repeat here without the aid of a blackboard and an algebraic framework. In another case (August 20, page 365) a court was called on to decide whether the Southern Pacific Company operated a railroad in New York City! Readers interested in these things will have noticed the case reported August 13, page 298, wherein the law forbidding the running of freight trains with chain couplings and without air brakes was rigidly enforced by the court, although the railroad company had secured substantial safety by moving the train at very low speed.

It is true, of course, that, in these litigated cases, the sin referred to in the Scripture which we have cited is not committed by the same authority that does the hair-splitting. The courts do the hair-splitting, and in the majority of cases, no doubt, believe that the course taken is unavoidable. For the neglect of the weightier matters, the blame rests not on the courts but on congress, or a legislature or (sometimes) on the executive department of the government. The Interstate Commerce Commission itself is not free from criticism in the direction here referred to. Its members frequently find themselves responsible for a series of acts affecting a given person, or a given city or a given railroad, which embody both of the two elements constituting the offense here condemned in Scripture. However, the citizen who himself suffers injustice in the transportation field or who feels the burdens that weigh on his community or his line of business cannot blame the commission alone; nor congress, nor the President, nor the courts, nor the state legislatures; no one branch can be singled out. It is government as a whole. The railroads are ruled by the government, and the government has not learned its business. Putting it another way, and speaking the language of democracy, it might be said that the people are trying to govern themselves wisely, but do not know how.

There is another phase of this question of incompetent government, namely, the inability of the judges to understand the technicalities of the railway service. It is a case of this kind, a decision in the Circuit Court of Appeals, Seventh circuit, handed down August 6, interpreting the hours of service law as related to railway employees who transmit information by telephone, which has led to the foregoing reflections. The report was printed in last week's issue. It is scarcely to be wondered at that the judges nod now and then. They can see what utterly fantastic and futile ideas must have prevailed in the legislative bodies where these grotesque statutes were adopted, and it must often be that only by the sternest devotion to duty can the judge keep himself awake during the tedious arguments of the lawyers over shades of meaning so fine that only some chemico-photographic process—no faculty of the human brain—can distinguish them.

In the case referred to the decision hinges on the meaning of the term "orders" as relating to train orders. Every railroad man knows that this term, "train orders," commonly shortened to "orders," means those orders of the train despatcher, always put in writing, which direct some person either to move or to restrain a train, *with relation to the right to the use of the track.* But one train can occupy a given piece of track at a given time, and a main function of train orders is to prevent everybody from doing anything that may tend to violate this axiom. If an engineman makes any move toward violation he is risking lives and valuable property, and hence "orders" have special importance. Every order is repeated by the recipient, word for word, in the hearing of the one who gives it. Any communication to an engineman which deals with matters less grave is not classed as "orders." The distinction between "orders" and all lesser writings is defined by the superintendent with great care and particularity. The labor-union philanthropists who drafted this law tried to recognize the true character of orders —they had no hope of getting the law passed unless they restricted this clause to communications ostensibly important—but in trying to make it sufficiently inclusive they went too far, and included all orders "affecting" train movements. A telegram ordering a quart of ice cream for the president's private car might "affect" the movement of a train, if the boy delivering the ice cream should be a few minutes late. Finding no solid ground on which strictly to define "orders," Judge Mack, in this case, allows the term to apply to the sending of information by telephone to guide a signalman at a crossing as to which of two roads should be given the preference in a given situation where trains of both are ready to cross. It cannot be that the Supreme Court, if appealed to, will support this decision. The railroad, in its claim that the switch tender in the shanty only imparted information, was on solid ground.

If the report, as printed, gives the whole of the argument, the railroad, in the words that we have italicized, conceded too much. The towerman was not bound to obey; was not bound, finally, to deal with the rival trains in accordance with the information given five minutes before the trains arrived. In three minutes' time conditions might be so changed as to change his decision. His real authority as to movement of trains over

the crossing, came from another source, not from the man who telephoned from the shanty.

But none of these technicalities weighed with Judges Baker, Kohlsaat and Mack. In the sentences which we have italicized they approve as an "order," affecting the safety of the public, a telephone message, conveying information which, so far as concerns any definite relation to safety, might have been wholly ignored, without harm; and which at most would tend to prevent a few minutes' delay to a passenger train.

If this decision holds, and if this is a wise and beneficent law, the provision for a nine-hour day can be almost indefinitely extended. We may expect the labor leaders next to "organize" the office boys so as to espouse the cause of the messenger whom the superintendent sends to ask a question of the train despatcher. The telephone girls in the hotels ought to come next; they ask questions which may "affect" the movement of trains. In the meantime these wise law-givers permit trainmen—with whom the danger from mental inefficiency is as great as with telephone operators—to work 16 hours.

And if Judge Mack is correct, in a case like this, in taking into consideration all the remote influences which may affect the safety of a train movement—"regularity of service at one point might well prevent an accident at another point"—he is at liberty to go on and justify the most fantastic legislative restrictions on railway operation. The wife of the ticket agent who asks him to stop on the way to the office to give an order to the grocer, or who impairs his mental balance or his financial integrity by spending too much money at the milliner's, may find herself guilty of blocking the wheels of interstate commerce and impairing the safety of passenger travel!

A GOVERNMENT VIEW OF GOVERNMENT MANAGEMENT

WHEN the campaign for the establishment of the parcel post was going on, its advocates claimed that it would confer numerous benefits on the people, and especially the common people, of the United States. The service rendered by it would be much better than that of the express companies. The rates charged would be much lower. The function performed by the middleman in the interchange of commodities between urban and rural communities would be eliminated. For this and various other reasons the cost of living would be reduced. The superiority of public-spirited government management over greedy private management would be clearly demonstrated.

The parcel post has now been in operation for three years. It is time to inquire whether its management and results have been as good as predicted. Inquiry into this matter is worth while, not only because it is desirable to know how the parcel post is working, but also because of the light which the way it is being managed must throw on the way larger business undertakings would be managed under government ownership. Some persons advocate government ownership and management of telegraphs and telephones, and even of railways, making claims as to the way they would be run similar to those which were made as to the way the parcel post would be run.

At this interesting juncture information as to the way the parcel post actually has been managed and as to its results is at hand. It has been furnished by an investigating committee representing congress, the body which created the parcel post, and composed of both senators and representatives. Its chairman was J. L. Bristow, then a senator from Kansas. While this report is most significant and instructive, very much less publicity has been given to its contents than was received by the claims made before it was established as to what the parcel post would do.

The parcel post was to serve and benefit all classes. The report of the Bristow committee shows that the service it has rendered to, and the benefits it has conferred on, the large mail order houses have been vastly greater than the service it has rendered to, and the benefits it has conferred on, all of the rest of the public together. The committee received reports regarding the parcel post business handled during six consecutive weeks by 37,745 postoffices out of a total of 56,974. The postoffices which did not report are nearly all small, and therefore the data collected cover practically all the business done. "It is a significant fact," says the committee, "that only 697 postoffices reported outgoing parcel post business in excess of their incoming business. In other words, 98.15 per cent received more parcel matter than they sent out, and only 1.85 per cent despatched a greater number of parcels than they received from other offices." "Even more illuminating," in the committee's language, is the fact that 46,514,699, or 60 per cent of the 77,539,521 parcels despatched, were sent from New York City (not including Brooklyn) and Chicago.

"The tremendous amount of merchandise sent out by the mail order houses of these cities is," it adds, "of course, the explanation of this condition. The amount, moreover, of the parcel post business which originates in these two cities is greatly in excess of that shown by the reports of the postmasters, because large houses in these cities ship by freight their catalogues and great quantities of their merchandise to many distributing centers, such as Jacksonville, Fla.; Little Rock, Ark.; Evansville, Ind.; Cedar Rapids, Iowa; Salina, Kan.; Augusta, Me.; Hattiesburg, Miss.; Jefferson City, Mo., and Billings, Mont., and the catalogues and merchandise are then distributed through the mail by these smaller offices and are reported to the committee and to the department as mail originating in these offices. * * * It appears, indeed, that the volume of parcel post business from these (mail order) sources exceeds that received from all other sources combined."

One of the ways in which it was confidently predicted that the parcel post would be utilized was by farmers sending their products direct to consumers in cities. The committee says that by the data compiled by it "the failure of the parcel post thus far to justify the predictions made for it as a means of direct transportation from the farmer to the consumer of farm products is, in fact, clearly indicated." As compared with the total parcel post business the amount originating on the farms has been negligible.

The service of the parcel post was not only to benefit all, but was to be far superior to that of the express companies. The Bristow committee finds that thus far its service has been very unsatisfactory. When the mail consisted almost entirely of letters and papers it was the practice to use sacks as containers for mail in transit. Government departments have never been notable for adapting their methods to new conditions and requirements; and the postoffice department has been shipping parcel post matter in the same sacks as other mail. The postmaster general in his report for the year ending June 30, 1914, said, "From actual count it has been found that the damage loss to ordinary parcels while in the mails is one-tenth of one per cent of the entire number handled. Damage loss has been due to improper packing rather than to the method of handling." The Bristow committee declares that information obtained by it from postmasters "does not confirm either of these statements. * * * The experience of postmasters demonstrated that the percentage of damage is unnecessarily high, as the direct result of crude methods of handling employed by the department. * * * These things are related not as isolated instances, but as the common practice in the handling of the mails, and it is stated that even when parcels are conspicuously marked 'fragile' they are often inclosed in the same sack with heavy hardware."

The committee criticizes the department for throwing sacks of mail containing parcel post matter from moving trains. It appeared to it "self-evident that fourth-class mail matter, even when well packed and heavily wrapped, cannot with safety be thrown to the ground from a rapidly moving train. * * * The express companies have not found it necessary to adopt the policy of throwing merchandise off moving trains for the sake of expediting delivery." The committee found evidence of many

other kinds of inefficiency, and reports that the failure of postal employees to exercise proper care in handling the mails is a weakness of the parcel post system which it certainly "lies within the power of the department to remedy speedily and effectively; but there is abundant evidence that the weakness exists to a marked degree. Sacks of mail are thrown into and out of vehicles used by mail messengers; they are thrown and kicked from mail cars to station platforms; they are trampled upon by postal employees and other persons; they are exposed to rain and snow without protection. Not all railway mail clerks and mail messengers are guilty of these practices; but the practices are common in the service, and were made the subject of comment by hundreds of postmasters."

Those who oppose government ownership and management of different kinds of business repeatedly are met with the argument that the service rendered by the postoffice department is efficient. The foregoing statements of fact can hardly be denied to be authoritative, and they hardly indicate that degree of superiority often attributed to the postal service.

Since the inauguration of the parcel post the postoffice department has greatly developed the system of concentrating mails for sorting and rehandling at terminal postoffices, thereby reducing the amount of this work done on trains. The Postmaster General has declared that this system is of value because it promotes economy and furthers the expeditious handling of the mails. The investigating committee declares, however, that the information it gathered "is sufficient to make it clear that whatever economy is now being effected by the use of this method is effected at the expense of the efficiency of the service in the expeditious delivery of parcel mail. * * * The public," it adds, "is vitally interested in securing, and has a right to expect, transportation service that offers expeditious delivery as well as reasonable security from damage to parcels in transit. It is the claim of the express companies that they are giving a service that is superior to the parcel post in both these respects, and in so far as the use of the terminal railway postoffice plan is contributing to delay in the delivery of fourth class mail matter, it is working to the detriment of the postal service."

One of the ways in which the express companies allege that their service is superior to that of the postoffice department is in their facilities for tracing parcels which fail to arrive at destination. With the exception of insured and C. O. D. parcels, no record is kept of the receipt or delivery of fourth-class mail, and it is impossible to trace an ordinary piece of parcel mail. The express companies, on the other hand, use a system of waybilling all parcels. The department handles millions of extremely small packages, the average revenue from which is small, and "under these conditions," the committee concludes, "it will not be possible for the postoffice department to give as complete and reliable a service for all parcels as is possible for express companies."

Even when parcel post matter is insured and a record of it is kept, the results of attempts to recover lost packages are very unsatisfactory. The department estimates that 800,000,000 parcels are handled annually by mail. Only approximately 13,000,000, or 1.63 per cent, of these are insured. "In the case of 98.37 per cent of the present parcel post business, therefore, the public is without indemnity against loss and without means for tracing parcels which fail to reach the addressees. * * * The fact that many persons prefer to intrust their valuable parcels to express shipments and are using the parcel post only for the transportation of articles of slight value undoubtedly accounts to some degree for this condition. Reports received from postmasters, however, indicate that a further reason for this lack of general patronage of the insurance system is to be found in the fact that experience with the department's operation of the insurance plan has not tended to create confidence in it. The general criticism is that the system in use in the adjudication of claims for loss or damage is so complicated and involves such delay in settlement that much dissatisfaction has resulted among patrons." And yet, advocates of government ownership complain that private railways are slow about settling claims!

The foregoing are some of the principal criticisms made by the joint committee of the parcel post service. The committee also had much fault to find with the very radical changes in rates and weight limits which have been made by orders of the postmaster general. One of these orders practically abolished the first zone on which rates were based, thereby making the rates for the first zone cover also the second zone. It is, as the committee says, a well known principle of transportation that the through rate ordinarily should not be more than the sum of the local rates. In fact, this principle has been specifically enforced against the railways of the United States by its embodiment in a provision of the act to regulate commerce. While the railways are required to observe this principle, the postoffice department, as a result of the order of the postmaster general practically abolishing the first zone, flagrantly violates it. For instance, if a package weighing 20 lb. is sent from St. Louis to Emporia, Kan., through Kansas City without stopping, the rate is 83 cents. If, however, the package goes from St. Louis to Kansas City, is delivered there and then remailed to Emporia, Kan., the rate is, St. Louis to Kansas City, 44 cents; Kansas City to Emporia, 24 cents; total, 68 cents. "That," says the committee, "is repeated all over the United States. * * * Rates which make possible such a practice cannot be defended. They violate one of the cardinal principles of transportation." The unfair discrimination involved is obvious. If a railroad president should order rates to be made as the postmaster general has done, he could be indicted by a federal grand jury and put in jail for violating the act to regulate commerce.

The Moon bill to regulate the compensation of the railways for carrying the mail, which was introduced in congress at the last session, would give the postmaster general practically arbitrary power to fix the mail pay of the railways. There are persons who express confidence that he would exercise this power wisely and fairly. The postmaster general has already the power to make changes in the parcel service and rates, and the Bristow committee says of the way he exercised it: "The committee's study of the effects of these orders convinces it that the exercise thus far made of the power lodged in the postmaster general to change rates and weight limits has been, in several respects, unfortunate for the service. * * * No other change made by departmental order has been so inequitable as the one which practically merges the first and second zones."

The advocates of the parcel post controverted the argument made against it that it would help the mail order houses at the expense of the country merchants. With reference to this zone order, however, the Bristow committee says, "Its effect is to benefit especially the mail order houses by giving them an undue advantage over the local dealers in transportation service. Under the zone scheme now in effect, a mail order house can establish a branch agency in the territory which the concern seeks to reach, and within a radial distance of 150 miles from the location of such agency, the mail order house gets exactly the same rate as the government charges the local merchant, who ships only a few miles, notwithstanding the marked difference in the cost of the transportation service rendered." For example, if a mail order house ships a 50 lb. parcel from Kansas City to Bavaria, Kan., which is 193 miles by rail, but within a radial distance of 150 miles, it pays 54 cents. If a merchant at Salina, Kan., ships a parcel to Bavaria, a distance of seven miles, he likewise pays 54 cents. The Bristow committee adds that "this example stated could be duplicated in every part of the United States."

This is the way the government of the United States conducts its parcel post business. And at the same time it passes laws and maintains an Interstate Commerce Commission to prevent railways from discriminating in favor of big concerns and against little concerns! Consistency is a jewel, but apparently one which Uncle Sam does not prize.

The accounts of the postoffice department always have been kept in such a way that it has been difficult to make even an intelligent guess as to the expense incurred in rendering any class

of service. This is true as to the parcel post service and, furthermore, nobody knows how much revenue is being derived from it. The Bristow committee says: "The law originally made provision for a special stamp by which the receipts could, with some accuracy, be obtained, but the refusal of the department to use the special stamp as the law provided that it should, and the further merging of third and fourth class postage has thrown the whole accounting system into complete confusion." This sounds like accusing the department of being a law-breaker. And in spite of the fact that it is absolutely impossible for anybody to find out either what the parcel post earns or what it costs, there are many silly people who talk about it being a "success," and who even tell you that it is profitable!

The government by the inauguration of the parcel post engaged in the business of transporting commodities in competition with the express companies and the railways. The foregoing from the report of the Bristow committee shows how remarkably efficient a manager of a transportation concern the government has thus far shown itself to be. It started out to establish an agency which would benefit the entire public, but it has so run it as to benefit almost nobody but a few wealthy mail order houses in the large cities. It was going to use this agency to reduce the cost of living, but the cost of living has not been affected. It was going to render a much better service than the express companies, but a congressional investigating committee is forced repeatedly to contrast government methods unfavorably with those of the express companies. The government prohibits unfair discrimination by railways, but in the service and rates of its own parcel post it commits discriminations which, if committed by the railways, would cause them and their officers to be indicted. Through the Interstate Commerce Commission the government prescribes the accounts which must be kept by the railways; and then it keeps the books of its parcel post in such a way as to cause a congressional committee to say that "it has thrown the whole accounting system (of the postal department) into complete confusion."

We commend this excellent example of government management of a transportation system to the consideration of all those who want the government to own and manage the railways. If the government manages a comparatively small and trifling business like that of the parcel post in this way, upon what ground can it be contended by any rational human being that it would wisely and efficiently manage the enormously larger and more complex business of our railways?

NEW BOOKS

The Railway Library for 1914. Compiled by Slason Thompson, director of the Bureau of Railway News and Statistics, Chicago, Ill. 465 pages. 5 in. by 8 in. Bound in cloth. Published by the author, 1529 Railway Exchange, Chicago. Price $1.

This is the sixth edition of Mr. Thompson's annual compilation of noteworthy addresses and papers delivered during the year on railway subjects. It contains 47 articles and addresses, mostly dealing with the railway problems of the present day by some of the most prominent railway officers and students of railway questions. To form a background the volume opens with a chapter from Seymour Dunbar's "History of Travel in America," which deals with stage-coaching in the days just before the railway came. Then follows a series of addresses and a series of papers on railway valuation and taxation, railway mail pay, parcel post and express rates. These include articles from various publications, including several which have appeared in the *Railway Age Gazette*. The subject of government ownership is treated in articles by Seth Low, W. M. Acworth and former Senator Jonathan Bourne, Jr. Several articles are devoted to the part the railway companies are playing in the European war. The concluding chapter of the volume consists of the annual statistical report of the Bureau of Railway News and Statistics.

Letters to the Editor

DOESN'T LIKE THE GROSS TON

MONTREAL

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

That we are creatures of habit no one will attempt to deny. But when we admit this, we generally mean that it is our own habits to which we are slaves. As a matter of fact, however, we are as much the slaves of habits handed down to us as of our own.

For instance, what is the gross ton but a habit handed down to us from the Lord knows who? And can anyone say why we should continue to use it?

What is the use of it? Did you ever stop to think what it costs us in clerical work, taking the country as a whole?

It is cumbersome, costly and useless. It leads to many errors, wicked thoughts and cuss words. Why not throw it overboard, as the other Jonah was thrown over. If a whale wants to swallow it to use in making up his books, let him. He is all gross, anyway.

Seriously, I believe there are a great number of people who would be glad to get away from it, but they want a lead. Won't you be the one to give it to them?

E. J. MCVEIGH
General Storekeeper, Grand Trunk Railway

STATISTICS THAT ARE WORTH WHILE IN RAILROAD MANAGEMENT

DETROIT, MICH.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

Railroad statistics are of two kinds—one represents the tabulation of data setting forth facts applying to the details of railroad operation, the result of much labor and painstaking elaboration, compiled for the purpose of showing *what has been done*. This class of statistics belongs to the realm of the schoolmaster who performs endless duties day by day regardless of how much benefit results from his labor aside from the presentation of facts. The other kind of statistics represents tabulations having for their purpose constructive efficiency and showing *what should be done*. The difference between these two kinds of statistics is the difference between an acceptance of what seems to be the inevitable on the one hand and what is believed to be intrinsically beneficial on the other hand

Successful railroad operation is elusive. It is so complicated under established regulations, and its ramifications are so far reaching, that the strongest and most efficient manager will readily confess that there is still something for him to learn. Managerial duties as well as the duties of other officers are so engrossing that specialists will henceforth become an important factor in maintaining the equilibruim of a well-poised management.

A certain railroad in Central Classification territory has been burdened with a repetition of receiverships. Its name in the past has been a by-word for all that was hopeless. Upon recent reorganization a study was made of its operating cost and fixed charges as compared with its revenues. From this study was deduced certain facts clearly established as to costs prevailing and *actually accruing*, both as to anticipated upkeep, or maintenance, operation and administration, with due regard for the elimination of all waste and needless expense. These units of results of actual operating cost were applied to other units of fixed charges and maturities. The result produced the unit that had to be maintained for a livelihood *bare of profit*. From this stage it was easy to proceed to reach units of revenues which were required to produce *profitable results*.

This analysis or study constituted the premises or basis upon which was built a comprehensive statistical system by which is

determined within five days after the handling of freight the average ton-mile revenue rate applying. This ton-mile rate is carried along cumulatively for the fiscal year as it progresses, and thus is made the barometer as to profit within quick hailing distance of the watchful manager and traffic official. A detail of the business of each station as to commodities and ton-mile rates applicable thereto, together with the unprofitable tonnage carried, separately stated, is a part of the tabulation, also available within five days after the close of each week. Freight constitutes 85 per cent of the revenues of the railroad referred to, and is the prime factor in its earnings.

These statistics are not only constructively efficient, but are vital in the profitable operation of the road, and will serve to illustrate what is meant in the caption, "Statistics That Are Worth While in Railroad Managament."

T. D. HINCHCLIFFE
General Auditor, Detroit, Toledo & Ironton.

REPLYING TO "A CLERK'S PLEA"

WASHINGTON, D. C.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

The article entitled "A Clerk's Plea," written by M. S., on page 459 of your September 10 issue, is certainly a very strong plea for better education of the railroad clerk. I must, however, take exception to that paragraph reading:

"It is an irony of life to neglect the greatest things. Take the greatest industry of the country—agriculture—and it is surprising to learn how few are the institutions teaching us to be good farmers. Step to the next largest field, the railroad field, and you will find no school at all."

In writing the above paragraph, I fear that M. S. has overlooked the various state agricultural colleges and the Department of Agriculture of the United States, which maintains various experimental farms and issues farm bulletins with all of the advantages, ideas and experiments. And stepping to the next largest field, the railroad, that there is no school in which a clerk may acquire knowledge. There are several institutions throughout the country that make a specialty of this particular branch of education.

But before we speak of the school, let us first investigate to what extent the clerk employed in the railroad office has used the means which are at his elbow. If he is a clerk in the traffic department he must know something of tariffs, the adjustment of rates, and the construction of the tariffs. Has the clerk ever read Interstate Commerce Commission Circular 18-A, which describes the form of tariff? Does he know how many forms of concurrence are issued, and the application of each? Has he ever taken a tariff and read it through from cover to cover, or does he only use it as a reference? Has he ever read a bill of lading? Does he know that the "Official Guide" carries mileage of railroads in the front part of the book? Does he know that it gives stations and distances between depots as well as carrying time tables? Has he ever read the Act to Regulate Commerce, with its amendments? Has he ever read the Conference Bulletin No. 6, giving interpretations of the commission, and certain administrative rulings?

These are commonplace publications. My long experience in railroad offices prompts these many questions. It does look queer for a tariff man who constructs a freight tariff to go ahead without consulting his specifications which are included in circular 18-A. You would think it queer if a builder put up a building without reading his specifications—but it is done every day with tariffs.

What I have said about the traffic man, may be said of the accounting department clerk. I dare say that few of them have read the various accounting department circulars, issued by the Interstate Commerce Commission, but depend entirely on their chief clerks and others for guidance in the various accounts chargeable.

The trouble is that there are not enough men who have read Elbert Hubbard's little book about "Delivering a Message to Garcia." I believe that there is just as much chance for promotion and advancement among clerks as in any department of commerce. I believe that there is just as much chance for recognition of ability and merit as there would be in any commercial organization. And if the clerks would apply themselves to the means at hand, their advancement would be more rapid than it is at the present time. I know of good clerks who are conscientious, and as loyal to the company as any set of men, but they are not loyal to themselves, by seeking every avenue of opinion and grasping every opportunity to acquire greater knowledge about their particular work.

I remember a newspaper that stated that in its Sunday edition it was going to give the name and picture of the smartest man in the town; in the Sunday edition it published a picture of a very insignificant looking man, who was the "Answers to Correspondence" editor of the paper. His entire knowledge consisted of knowing where to go to get information. If the railroad clerk would examine the various circulars, pamphlets, tariffs, newspapers, etc., that come under his observation, not to memorize them, but to know where to go for certain kinds of information, and if he would make that his maxim, he would soon be recognized in the office as the man who could "deliver a message to Garcia."

G. B. GUTHRIE
Agent Official Freight Traffic Directory.

THE RAILWAYS OF CHILI

NEW YORK

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

A map has been compiled and issued recently by the government of Chili, which shows all the railways, with profiles, lengths of steamship routes between ports and to the principal ports of the world, and considerable detailed data regarding the length and gage of the lines, which differs somewhat from that hitherto available. The length given includes all branches and all lines actually under construction in 1914. There is a total length of 130 kilometers of double track of the 5 ft. 6 in. gage.

Gage	*Length*	
Feet	*Meters*	*Kilometers*
5 ft. 6 in.	1.676	2,577*
4 " 9 "	1.445**	29
4 " 8½ "	1.435	725
4 " 2 "	1.270	184
3 " 0 "	1.067	451
3 " 3⅜ "	1.000	3,561***
2 " 6 "	0.762	648
2 " 5½ "	0.750	10
2 " 0 "	0.600	317
Total		8,502 Kms

** Electric lines.
* Length of main line track, 2,707 kms.
*** Includes Antofogasta 657 kms. changing from 2 ft. 6 in. to meter.

Definite studies (final locations) have been made of the last link in the Longitudinal Railway, from Arica to Zapiga, 278 kms., which is not included in the above. Most of the lines are owned and operated by the Government, the distribution being as follows:

Government	5,502
Private	3,000
	8,502

There are 160 kms. of rack railway, and two sections of mixed gage, from Ovalle to Coquimbo and La Serena (5 ft. 6 in. and meter gage), and from Toledo to Paipote (4 ft. 8½ in. and meter gage).

F. LAVIS
Consulting Engineer.

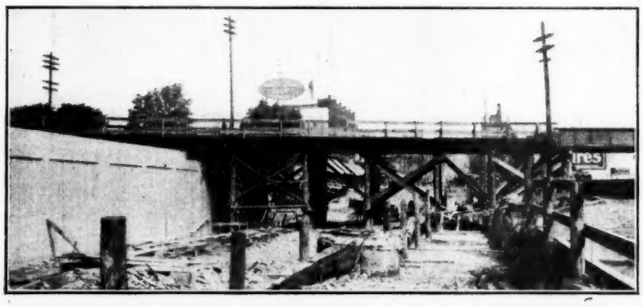
THE SUEZ CANAL.—During the first six months of the current year, 1,750 ships passed through the Suez Canal, paying passenger and transit dues to the amount of about $8,750,000. The corresponding movement in the first half of 1914 was 2,571 ships, and the amount paid was in the neighborhood of $13,000,000. If one deducts the number of German, Austrian and Turkish ships which passed through the canal in the first half of 1914, and also allow for the dues paid by them, the figures for 1915 are little below what has come to be regarded as the normal level.

Grade Crossing Elimination in North Toronto, Ontario

The Canadian Pacific Is Completing the Elevation of Its Track for 2½ Miles at a Cost of $2,750,000

The Canadian Pacific is completing the elevation of its tracks in North Toronto for a distance of about 2½ miles, which involves the building of a new passenger station at North Toronto and the rebuilding of two local freight yards. This line of the Canadian Pacific is the original main line and crosses the highland a little more than two miles back from the lake front in the northern part of Toronto, and is about four miles shorter than the line which makes a detour south through the business district of the city. This line also avoids the grades necessary to reach the lower ground at the lake front. The traffic at the present time consists of two passenger trains and an average of five freight trains in each direction, and while this is relatively light, it promises to be much greater in the future. The line had been double tracked previously as far as the viaduct 80 ft. high over the Don valley, which at this point is a part of Reservoir Park.

The presence of the railroad has made an industrial district



Yonge Street Showing Excavation for Street Depression

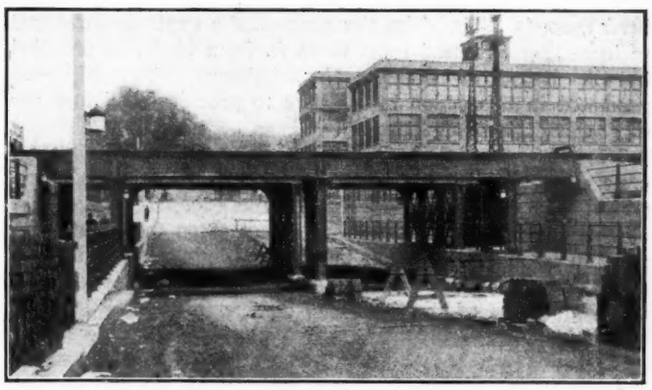
of the territory immediately adjacent to the tracks, but outside of this it is entirely a high-class residence district, particularly the St. Clair avenue district, of relatively recent development, two blocks north on a ridge overlooking the tracks. It was largely the presence of this rapidly developing residential district, accessible from the business center of Toronto only by streets crossing the railroad, which was really responsible for the movement for the elimination of the grade crossings.

The project starts on the west at a grade crossing at Dufferin street with a 0.4 per cent ascending grade for a distance of 1,700 ft. to the first subway at Dovercourt road. From there east the grade is level, or nearly so, as far as Avenue road, a distance of 1¾ miles, where a 0.4 per cent grade rises eastward for 1,000 ft. to the Yonge street subway. From Yonge street there is a 0.5 per cent descending grade which brings the track to the original grade 1,800 ft. farther east at the west end of the Don valley bridge. Summerhill avenue, just west of this bridge, will continue to be a grade crossing for the present. There are tentative plans to divert this street to a location under the end of the ravine bridge, a scheme which the topography of the site will readily permit.

Subways have been provided at Dovercourt road, Ossington avenue, Shaw street, Christie street, Bathhurst street, Howland avenue, Spadina road, Davenport road, Avenue road and Yonge street. Albany avenue and Huron streets have been closed. A number of other streets which did not cross the railroad previous to the track elevation continue closed at present. Bridgeman street was extended from Albany street to Bathhurst street so that the former might have an outlet through the Howland avenue subway. Davenport road and Poplar Plain road, which previously intersected just south of the tracks, have been relocated between Dupont street and McPherson avenue to provide for a single square subway instead of two skew subways.

The Canadian Northern Ontario, desiring to obtain access to North Toronto, has arranged with the Canadian Pacific for the joint use of two tracks from a junction near Dovercourt road to Avenue road. These joint tracks are at 13 ft. centers and occupy equal portions of the Canadian Pacific right of way and of the lands acquired by the Canadian Northern Ontario immediately to the north. A service track is being provided to the north of the joint tracks for the Canadian Northern Ontario and a similar track for the Canadian Pacific on the south. The latter track, however, is placed 26 ft. southerly of the nearest joint track, in order to permit the construction of an additional main line track when this becomes necessary. It is understood the cost of this section of the work will be borne equally by the two railway companies and that the Canadian Northern Ontario will acquire the use, conjointly with the Canadian Pacific, of the Union Station and facilities which the latter is constructing between Avenue road and Summerhill avenue.

The city of Toronto bears 25 per cent of the estimated cost of grade separation based upon the elevation of two tracks only, including the property damages. The street car company pays 10 per cent of the cost of the Avenue road subway which they occupy with two tracks, also on the basis of the elevation of two tracks. The cost of the Yonge street subway is subdivided somewhat differently. When the line was built in 1880 the railway company agreed to provide a subway having



Christie Street Subway

a head-room of 14 ft. at its own expense whenever the city so desired.

In this grade separation consideration was given to the large industrial development alongside the railway tracks, and as a means to facilitate further development in this direction, the tracks were raised to such a height only as would permit the existing sidings, some 21 in all, to be retained at their original level for loading purposes, and to be brought up to the south service track on grades of not more than 2 per cent. With few exceptions this has been obtained without the use of retaining walls or trestles, and was further facilitated by dropping the service track between subways on 0.4 per cent grades, as shown on the profile.

At the inception of the project, the Canadian Pacific had two team yards, one east and one west of Yonge street. No change was required in the yard west of Yonge street, which also includes a small freight station, other than to provide a 2 per cent approach grade descending from the west. The

yard east of Yonge street, however, was entirely rearranged. As now complete, the yard west of Yonge street has a capacity of about 80 cars, and that east of Yonge street will have a capacity of about 54 cars when completed.

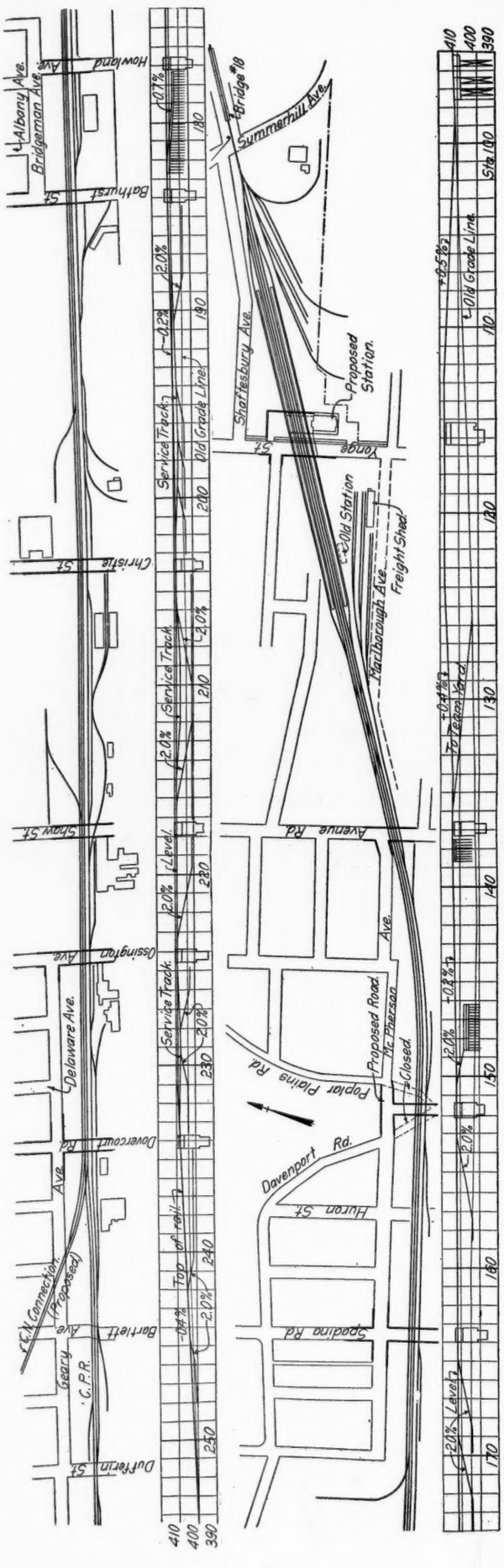
SUBWAYS

All of the subways consist of steel through plate girder spans on masonry abutments with supports at the center lines of the streets and at the curb lines except for Christie street, which has supports at the curb lines only. As previously mentioned, the depression of the roadway of most of the streets is considerable. The sidewalks, however, have in most cases been depressed only enough to give a head room of about eight ft. and hand railings have been provided along the high curb walls for the safety of the pedestrians. Depression of the streets is accomplished by 5 per cent approach grades which involve not only the streets passing under the subways, but in a number of instances include also some east and west streets which intersect the subway streets just north of the tracks. While 5 per cent grades for the streets are somewhat in excess of those used on track elevation projects in some other cities, they are entirely justified in Toronto, where the topography is such that many streets have steeper grades, the maximum being about 10 per cent. By the use of the shorter approaches possible with the steeper grades, it has been possible to reduce materially the number of potential damage claims. The streets are paved with brick on a concrete base, this being the type of pavement in use on a number of the streets before construction was started. The selection was governed largely, however, by the adaptability of this type of pavement to steep grades.

The head room provided in the roadway is greater than that usually provided in track elevation projects. In all subways save two it is 14 ft., no distinction being made between streets used by car lines and those not so used. At Yonge street the head room is 18 ft. The city pays all the expenses incidental to increasing this head room to 18 ft. from 14 ft., as provided by the Board of Railway Commissioners. The city was prompted in this action by a desire to provide for future use of double deck motor 'buses.

The substructures of all of the subways are of mass concrete except at Yonge street, where reinforced concrete, counterfort type abutments were used. The exposed faces of the abutments and retaining walls were not given the same treatment in all cases. As seen in the accompanying photographs, the abutments of the Yonge street subway have paneled faces, while the faces of the walls and abutments at Christie street are divided into horizontal courses about 18 in. wide by the use of one-inch V-molds. All concrete work was done by contract. This consisted almost entirely of the substructure for the subways, as very few retaining walls were necessary. Wells & Gray, Limited, engineers and contractors, Toronto, had the contract for five of the subways. Jennings & Ross, Limited, Toronto, had one, and McFarland, Pratt & Hanley, Toronto, built the other four. The concrete for the Avenue road subway was handled by a spout and tower. On all of the other structures the concrete was delivered in wheelbarrows and buggies. The total quantity of the concrete was 30,000 cu. yd., exclusive of that required for paving.

On all of the subways except that for Avenue road, which was built first, transverse I-beam floors of the ballast type were provided which give the unusually small depth from base of rail to low iron of only 24⅞ in. This has been accomplished by the use of 10 in. by 9 in., 44-lb. Bethlehem sections, spaced 1 ft. 3 in. center to center. The I-beams were embedded in concrete finished flush with the top and bottom faces of the beams and carried up the sides of the girders to the under sides of the top flanges. Unlike most other track elevation subways of more than one track, the steel structure for each track is independent. Two single-strength girders were used for each track, spaced 11 ft. 8 in. center to center,



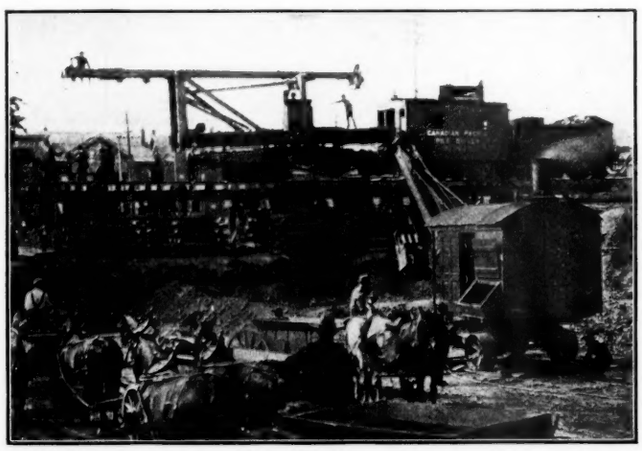
Plan and Profile of North Toronto Track Elevation

so that with a 13-ft. spacing of tracks, the adjacent girders of adjoining tracks are 1 ft. 4 in. center to center, connected at intervals by diaphragms. In the same way, no double-strength columns are used, as there is an independent bent for each track made up of two single-strength columns connected by cross bracing. In all, 6,400,000 lb. of structural steel were used in the subways. The Dominion Bridge Company fabricated and erected all of the subways except that for Avenue road, which was furnished complete by the Canadian Bridge Company.

All of the subway floors are protected by a membrane waterproofing which was made by Simes & Brother, Toronto. It consists of a layer of building paper followed by three layers of burlap and two layers of tar felt, all mopped down with pure rock asphalt and covered with another layer of building paper. The membrane was protected by an asphalt mastic of varying thickness graded to provide drainage. The backs of all abutments and retaining walls are covered with a waterproof membrane but without the mastic protection.

NORTH TORONTO PASSENGER STATION

The North Toronto passenger station of the Canadian Pacific, located south of the tracks, some 500 ft. west of Yonge street, will be replaced by a new station in a more convenient



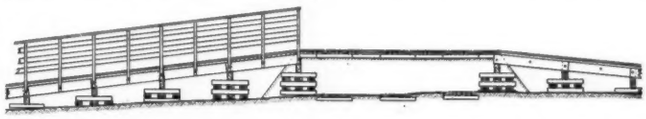
Replacing Tie Cribs with Pile Trestle at Subway

location on the east side of Yonge street, south of the tracks. This will consist of a building 80 ft. by 120 ft., separate from the track structure, with a baggage room to the north under the tracks which will be served by a driveway, also under the tracks east of the Yonge street subway. Three baggage truck elevators will be provided to give access to the platform overhead. From the station building a passage way east of the baggage room will lead to two passenger stairways for access to the platforms. The track layout at the station includes six tracks. There will be two freight tracks in the center with two westbound passenger tracks on the north and two eastbound passenger tracks on the south side. Each pair of passenger tracks is spaced 31 ft. center to center, with an island platform 1,100 ft. long between. On the south side, next to the station, there will be a baggage platform 260 ft. long, to serve the southernmost passenger tracks only. In connection with the new work, Yonge street has been increased in width 20 ft. between Marlborough and Shaftesbury avenues, a distance of about 750 ft.

GRADING

From Dufferin street to Avenue road the tracks were raised in place, the raise in the streets being made in an interesting manner by the use of tie cribs. The first operation was to place the tracks at the street crossings on stringers and mud sills, restricting this operation to one-half of the street at a time while traffic was permitted on the other half. As fast as the tracks were raised on the filling, corresponding raises were made at the street crossings by jacking up these tracks on the stringers and building cribs of cross ties to support them. To facilitate the work the tracks were raised about 8 in. at a time, corresponding approximately to the thickness of the ties used in the cribs. When the tracks had been raised to the full elevation the tie cribs were replaced by pile bents, as illustrated in the accompanying photograph, which supported the tracks during the excavation for the street depression, the construction of the masonry substructures and until the steel work could be erected.

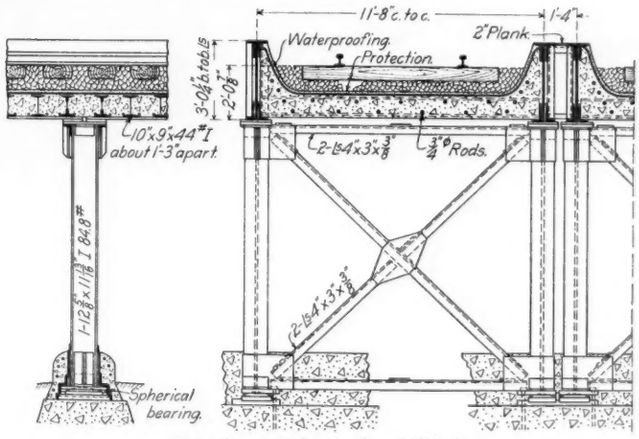
From Avenue road to Yonge street the situation did not permit of this method, necessitating the use of a single track



Temporary Grade Crossings—Blocked Up as Tracks Were Raised

trestle for that distance. Filling material was unloaded from this while trains were operated over a single track on the lower level. As soon as the embankment had been placed to a sufficient width to permit laying a track on the new grade to one side of the track on the trestle, trains were transferred to this new track, and the rest of the fill completed.

The use of tie cribs for raising the tracks interrupted the street traffic as soon as the initial lift was made. For this reason temporary crossings were provided at Huron street, Albany avenue and Delaware avenue, which were not to be provided with subways. To accomplish this with the least number of changes the tracks were humped up at these points as much as possible without disturbing the adjacent streets on either side or resorting to excessive grades. Temporary crossing planks were put down, supporting the approaches to either side of the new embankment on tie cribs similar to those used for raising the tracks at the other streets. These were raised from time to time as additional lifts were made on the tracks. All of the filling for the track elevation came from a shovel cut adjacent to the main track at Leaside two miles east. In all, 350,000 cu. yd. of filling were used.



Details of Subway Steel Work

Work was started in the fall of 1912, and continued to date except for a delay of six months in the spring of 1913, when an appeal was made to the Privy Council to have the tracks raised to a higher level than that authorized by the Railway Commission, thus reducing the depression of the streets. This objection, however, was not sustained. The work will be complete by the end of this year. The tracks have been elevated and the last work will be the completion of the passenger station and the Yonge street subway.

The work has been handled by the engineering department of

the Canadian Pacific under the direction of J. M. R. Fairbairn, assistant chief engineer, and A. L. Hertzberg, division engineer, with B. Ripley, assistant engineer in immediate charge. The structures were designed under the direction of P. B. Motley, bridge engineer.

WASHING LOCOMOTIVE SMOKE*

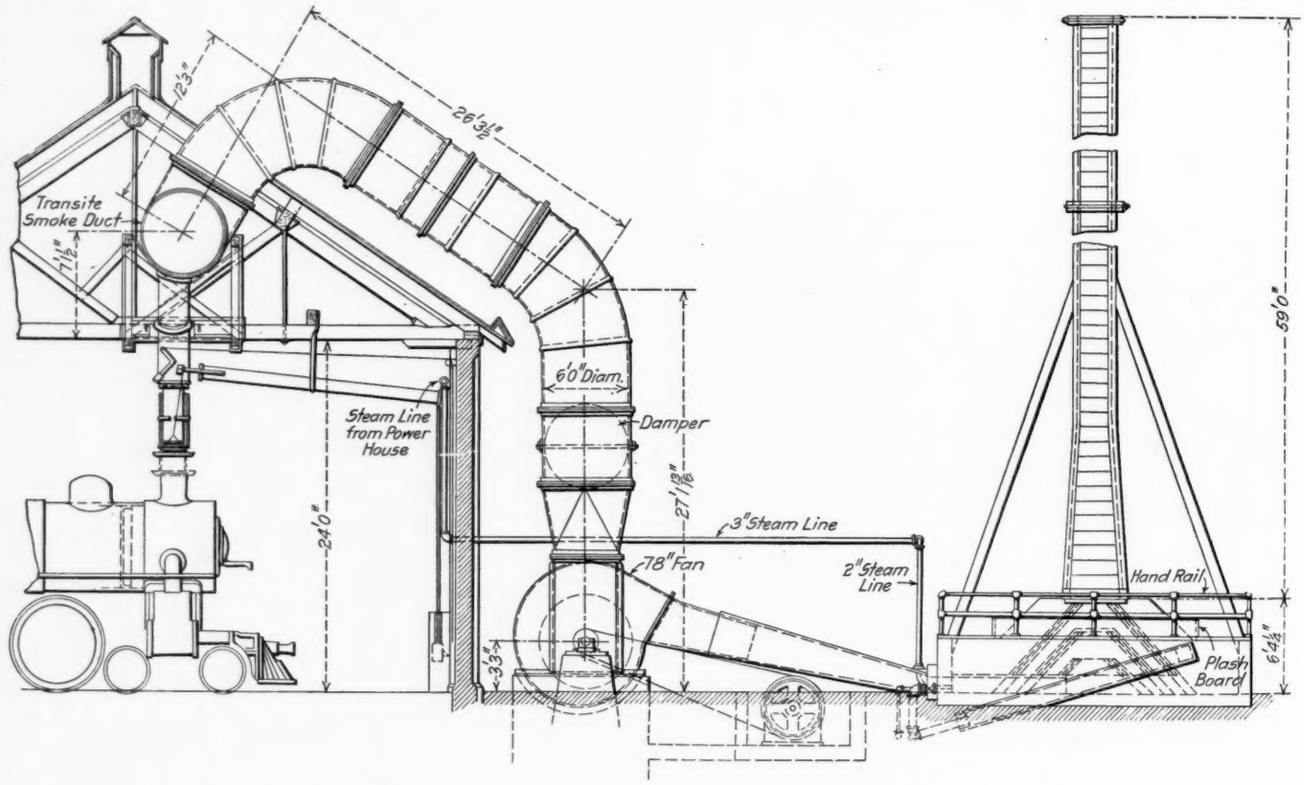
By M. D. Franey

Master Mechanic, New York Central, Elkhart, Ind.

The New York Central engine house in Chicago is located at Englewood station, near Indiana avenue and 63d street. It is adjacent to the White City, a popular amusement park, and surrounded by a very desirable residential district. The citizens are very insistent on the abatement of smoke, and object to the excessive use of the blower which is sometimes necessary for this purpose. While the New York Central locomotives west of Buffalo are equipped with the steam jet smoke consumer, which induces a flow of air above the fire and under the brick arch, and large blower capacity consisting of two 1¼-in. blowers, one on the right and one on the left side, it is found that these appliances are of little assistance in the elimination of smoke when building a new fire in a cold locomotivve. This was the great problem which confronted the mechanical officers of the New York Central in 1910, when it was found necessary to build a new engine house and terminal facilities at the Englewood station.

O. M. Foster, master mechanic in this territory at that time, after a careful study of smoke-washing devices which had been tried at other places with partial success, conceived the idea of forcing the smoke through a large body of water, by means of a fan separating the unconsumed carbon from the gas, permitting the latter to escape through a high stack and holding the carbon and other solids in suspension in the water. D. R. MacBain, superintendent of motive power, who had made a life-long study of smoke-abatement devices, approved of the plan. A small plant was built at Elkhart, Ind., capable of taking care of one locomotive, which gave results beyond expectation. To more thoroughly test the device, an experimental plant was built at Collinwood, Ohio, to take care of several locomotives. With the data collected from this experimental plant, the present smoke washer at Englewood was designed and constructed. The only drawback was in securing material that would withstand the powerful action of the various acids resulting from the combination of the gases, the solids and water.

The Englewood engine house has 30 stalls, in which from 80 to 100 locomotives are handled every 24 hours. It is built without a single smoke jack leading direct to the atmosphere. In washing the smoke, a large concrete tank is used, 22 ft. by 32 ft. This is subdivided by separating walls into three basins, each of which is lined on the interior with dressed lumber set in about 1½ in. from the concrete. The space between the concrete and the lining is filled with tar. Wooden pins, instead of nails, are used for fastening the lining, in order to resist the action of the acids. The drawings show the plan and elevation of the tank, the stack, the three hoods, the three ducts connecting the fan with the concrete basin, the fan and motor and the elbow connecting the fan with the large smoke duct in the engine house to which the smoke jacks connect.



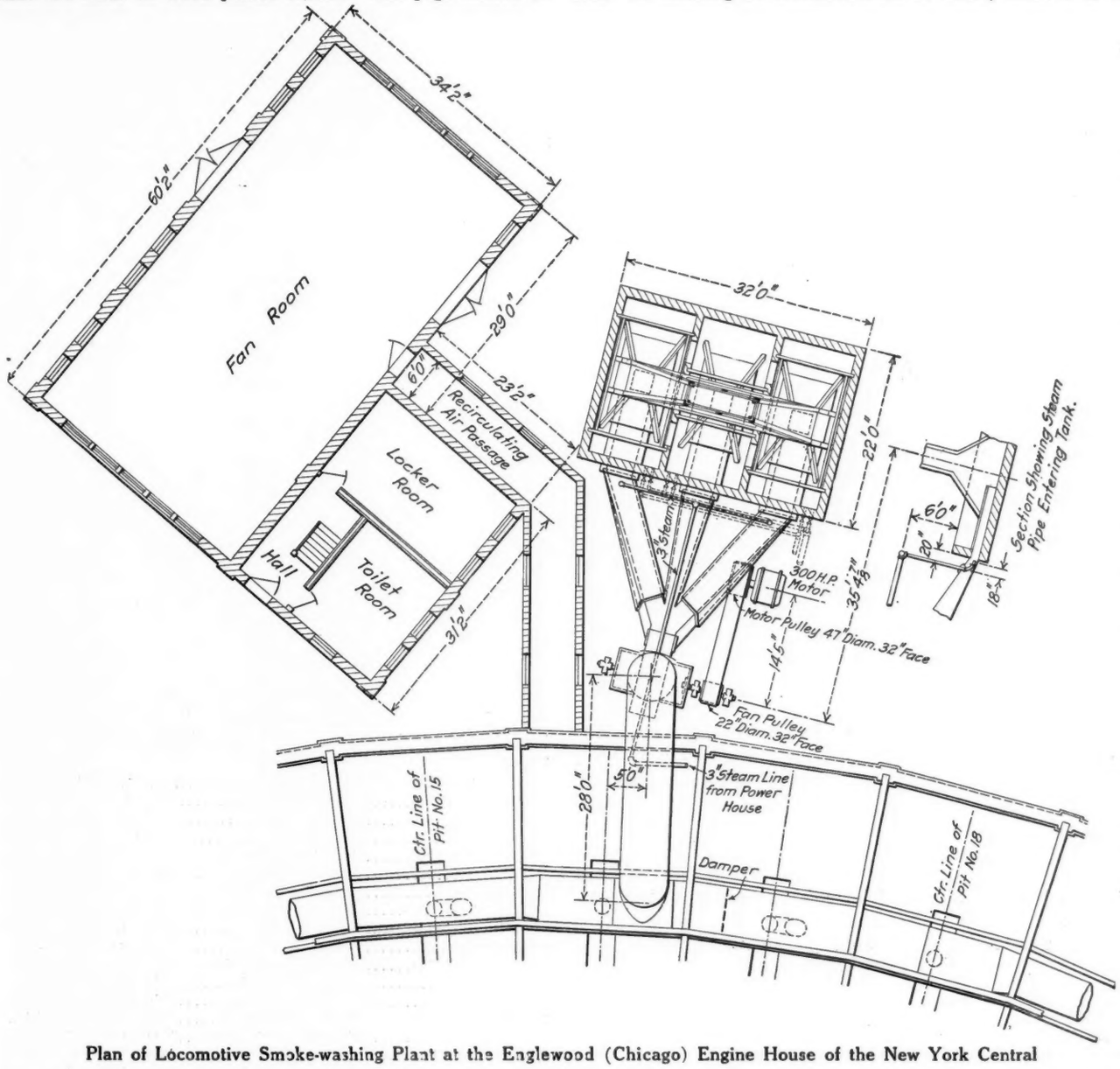
Locomotive Smoke-washing Plant at the Englewood Engine House

A large smoke duct, 60 in. in diameter at the center and tapering to 36 in. at the ends, extends around the engine house just under the roof and directly above the smoke stacks of the locomotives when the latter are headed in and standing in normal position. This smoke duct was built of transite material, and is connected with drop pipes leading down to each pit. In each of these drop pipes is a damper which is closed when the jack is not in use. Leading from each drop pipe is a telescopic jack made of cast iron and supported from the roof. These telescopic jacks have vertical, lateral and longitudinal movement to accommodate different positions of the locomotive stack. They are raised and lowered by a walking beam, counterbalanced with a weight and operated from the wall of the engine house. The damper is opened and closed from this same point.

Near the center of the house a large elbow connects into the

* Abstract of a paper presented at the tenth annual convention of the International Association for the Prevention of Smoke.

top of the 60-in. transite duct and leads down to a 78-in. steel plate, double-inlet fan, capable of handling 68,000 cu. ft. of gases at 500 deg. per minute, at a total static pressure of 14 in. at the fan outlet, and at a speed of 950 r.p.m. The fan is belt-driven by a 300 hp. constant speed, 300-400 r.p.m. motor. A smoke duct leads from the fan to each of the three concrete basins, the outlet to each duct coming directly under the hoods referred to above. There are three hoods in each tank. The top of the interior hood is open, while the top of the second hood is closed similar to a bell; the top of the third or outer hood is open and connects with the stack, which is approximately 60 ft. high. The three smoke ducts leading from the fan, the hoods and the stack are made of wood pinned together with pegs instead of nails. The lower portions of the three hoods extend down in the concrete basin and are submerged in the water.



Plan of Locomotive Smoke-washing Plant at the Englewood (Chicago) Engine House of the New York Central

An 8-in. hole is provided in each of the separating walls to insure a uniform level of water in the three basins. A special overflow pipe is provided to maintain 14 in. of water in the tanks and to prevent the carbon from escaping into the sewer. A 1¼-in. high-pressure steam jet, with proper elbow and nozzle pointing towards the outlet, is located in each of the three ducts and close to the concrete tank. The purpose of these steam jets is to accelerate and thoroughly mix the gases with the water and prevent them passing through the water in large bubbles. The gases are forced from the fan through the three smoke ducts into the water, passing out into the first hood. The water being thoroughly agitated at this point by the steam jets referred to, the gases are engulfed by the spray and wave action of the water and pass out through the top of the first hood into the second hood or bell, which, it will be remembered, has a closed top. They are forced down below the lower edge of this hood and pass to the third hood, and out of the water into the stack.

The carbons and solids are separated from the gases as they are forced through the water and rise to the top of the water in the tank in the form of a black, foamy scum. The gases pass out through the stack as a white vapor, practically odorless. In handling 80 locomotives in 24 hours, from 8 to 10 barrels of carbon are obtained from the smoke washer. This has the appearance of lampblack, and is thoroughly steam-dried after it is taken from the smoke washer. An analysis of this material is as follows:

Moisture	3.9 per cent
Carbon	82.6 per cent
Sulphur	2.6 per cent
Iron oxide	8.7 per cent
Silicia	1.8 per cent
Calcium oxide	trace

The sulphur and sulphuric acids are retained in the water. The city smoke department of Chicago and the nearby residents

are well pleased with the results obtained and on numerous occasions have complimented the plant very highly.

The estimated cost of making such an installation is from $15,000 to $18 000, where the property conditions are favorable. Owing to the property conditions and to the fact that the Englewood plant is an experimental one, the actual cost was somewhat greater. We made an investigation some time ago as to the cost of operation:

COST OF OPERATION PER DAY OF 24 HOURS

Water, 18,255 gallons, @ 7 cents per M	$1.28
Coal, 10.86 tons, @ $1.75 per ton	19.00
Electricity, 3,360 kilowatt hrs., @ $0.0129	43.34
Total	$63.62

SAVING EFFECTED BY THE USE OF WASHER PER DAY OF 24 HOURS

Fires maintained	$40.80
New fires built	7.11
Reduced electrical cost due to sliding scale rate	8.52
Total	$56.43

This makes the net cost of operating the washer $7.19 per day of 24 hours ($63.62 less $56.43). It is expected that we will be able to find a profitable use for the lampblack reclaimed by the smoke washer. This would, of course, result in still further decreasing the net cost of operation and might possibly show a profit.

We have found that where the fires are properly started the draft from the fan is sufficient to draw off the gases from the locomotive without the use of the blower. This means a decided reduction in the amount of water used, due to not using the steam blower, and also means a decided saving in coal consumption, due to the reduced draft. While we have quoted the results of some tests, it is difficult to obtain a set figure as to the amount of coal and water consumed by an engine at a terminal, due to varying conditions, such as smoke restrictions, temperature of the weather, and the human element or fire-up men. However, the tests showed to our entire satisfaction that the coal and water consumption is materially reduced on engines stored under the smoke jack and influenced by the draft of the smoke washer fan. The temperature of the firebox is more even and the fire-up man is able to handle a larger number of locomotives.

This smoke washer is operated under patents controlled by the American Smoke Washing Company, incorporated in Illinois, of which S. K. Dickerson, 5120 Greenwood avenue, Chicago, is secretary.

ACCIDENT BULLETIN No. 55

The Interstate Commerce Commission has issued Accident Bulletin No. 55, containing the record of railway accidents in the United States during January, February and March, 1915. The number of persons killed in train accidents was 65, and of injured 1,972. The total number of casualties of all classes reported, including industrial accidents, was 37,078; or 1,650 killed and 35,428 injured. The accidents are summarized as follows:

TABLE No. 1.—*Casualties to persons—Steam railways.*

Causes	Passengers Killed	Passengers Injured	Employees (including employees not on duty) Killed	Employees (including employees not on duty) Injured	Other persons (trespassers and non-trespassers) Killed	Other persons (trespassers and non-trespassers) Injured	Total persons Killed	Total persons Injured
Train accidents.								
Collisions	1	478	13	364	2	26	16	868
Derailments	5	589	35	329	1	23	41	941
Miscellaneous train accidents, including boiler explosions	..	4	6	157	2	2	8	163
Total	6	1,071	54	850	5	51	65	1,972
Other than train accidents.								
Accidents (212) to roadway or bridges not causing derailment	..	.....	.....	.....	.....	.....	.....	.....
Other Accidents (classes C3 to C12, inclusive)	36	1,560	363	8,156	1,118	2,158	1,517	11,874
Total	42	2,631	417	9,006	1,123	2,209	1,582	13,846
Industrial accidents to employees.								
While working on tracks or bridges	***	***	28	4,769	***	***	28	4,769
At stations, freight houses, engine-houses, etc	***	***	15	5,453	***	***	15	5,453
In and around shops	***	***	16	10,064	***	***	16	10,064
On boats and wharves	***	***	2	361	***	***	2	361
At other places	***	***	7	935	***	***	7	935
Total	***	***	68	21,582	***	***	68	21,582
Grand total	42	2,631	485	30,588	1,123	2,209	1,650	35,428

Table No. 1A, following, presents comparison with the quarterly bulletin next preceding and with the bulletin covering the corresponding quarter of the previous year:

TABLE No. 1A.—*Condensed summary of fatalities.*

	Item	Bulletin No. 55	Bulletin No. 54	Bulletin No. 51
1	Passengers killed in train accidents	6	8	13
2	Passengers killed, all causes	42	37	52
3	Employees (on duty) killed in train accidents	54	48	99
4	Employees (on duty) killed in coupling	26	14	44
5	Employees (on duty) killed, total	374	426	608
6	Total passengers and employees (items 2 and 5, above)	416	463	660
7	Other persons killed (including trespassers, non-trespassers, and employees not on duty), all causes	1,166	1,617	1,369
8	Employees killed in industrial accidents	68	82	79
	Grand total (items 6, 7, and 8)	1,650	2,162	2,108

The total number of collisions and derailments reported was 2,391 (763 collisions and 1,628 derailments), of which 100 collisions and 149 derailments affected passenger trains.

TABLE No. 2.—*Collisions and derailments.*

Classes.	Number	Killed	Injured	Damage to road and equipment
Collisions:				
Rear	101	4	333	$119,543
Butting	62	4	212	84,037
Train separating	55	...	11	24,432
Miscellaneous	545	8	312	239,831
Total	763	16	868	467,843
Derailment due to—				
Defects of roadway	423	10	474	347,906
Defects of equipment	762	4	174	562,751
Negligence	66	6	52	44,373
Unforeseen obstruction	74	9	89	63,361
Malicious obstruction	17	6	28	20,267
Miscellaneous causes	286	6	124	257,786
Total	1,628	41	941	1,296,444
Total collisions and derailments	2,391	57	1,809	1,764,287
Total for same quarter of—				
1914	3,185	112	2,165	2,343,957
1913	3,982	143	3,338	3,019,409
1912	3,903	217	4,251	3,368,125

The usual tables are given, classifying certain kinds of accidents in detail. Twenty accidents during this quarter were investigated by the inspectors. The accidents occurred as follows:

Chic., Burl. & Quincy	Liberty, Mo.	Jan. 1, Butting collision
St. Louis & S. F.	Olathe, Kans.	Jan. 3, Derailment
Minn. & St. Louis	Emmons, Minn.	Jan. 4, Derailment
Wabash	Runnells, Iowa	Jan. 15, Derailment
Seaboard Air Line	Osgood, N. C.	Jan. 19, Derailment
Erie	Glen Eyre, Pa.	Jan. 23, Derailment
Pennsylvania	Sizerville, Pa.	Jan. 30, Side collision
Atlantic Coast Line	Callahan, Fla.	Jan. 30, Derailment
Cin., Georgetown & Port.	Fair Oak, Ohio	Feb. 1, Butting collision
Pennsylvania	Irving, N. Y.	Feb. 2, Rear collision
Oregon Short Line	American Falls, Idaho	Feb. 5, Derailment
Balt. & Ohio	Youngstown, Ohio	Feb. 19, Derailment
Denver & Rio G.	Fountain, Colo.	Feb. 22, Derailment
Nevada-Cal.-Oregon	Horse Lake, Cal.	Feb. 23, Rear collision
Denver & Rio G.	Glenwood Springs, Colo.	Mar. 2, Derailment
Chic. & East Ill.	Shelburn, Ind.	Mar. 4, Derailment
A. T. & S. Fe	Elsinore Jn., Cal.	Mar. 5, Derailment.
Wabash	Garber, Ill.	Mar. 5, Butting collision
Wabash	Strahan, Iowa	Mar. 16, Derailment
Ahnapee & West	Forestville, Wis.	Mar. 29, Derailment

Electric railways reporting to the commission (not included in the foregoing statistics) had 76 persons killed during the quarter, and 1,023 injured; and there were 32 collisions and 14 derailments. Train accidents are charged with four fatalities. The total number of passengers killed from all causes was 4; and of employees 8 (3 in industrial accidents). The number of trespassers struck or run over by cars was 83 (20 killed and 63 injured).

Annual Meeting of the Railway Signal Association

Review of Committee Reports, Discussions and Other Business at the Convention Held in Salt Lake City Last Week

The twentieth annual convention of the Railway Signal Association was held in the Hotel Utah, Salt Lake City, Utah, September 14, 15 and 16, President T. S. Stevens, signal engineer of the Atchison, Topeka & Santa Fe, in the chair. The attendance was particularly representative of the western signal men, the total registration being 238.

After an invocation and an address of welcome by S. C. Park, mayor of Salt Lake City, President Stevens read his annual address. He emphasized particularly the responsibility of the individual members in the conduct of the association's affairs, urging careful attention to the selection of the very best available men for the officers and to the casting of individual votes on propositions submitted to letter ballot. He also emphasized the need of the members co-operating with the managing officers of the association to increase its practical value by adopting the conclusions of the Board of Direction as a guide for actual practice whenever possible; and if the result of the association's efforts cannot be adopted, constructive criticism should be submitted as a help in correcting errors.

The report of the secretary-treasurer showed a membership of 1,257, an increase of 20 during the past year, and a very satisfactory financial condition.

SIGNALING PRACTICE

The report of Committee I covered switch indicators, economics of signal maintenance, capacity of single-track and a reference to the A. R. A. clearance diagram. The adopted clause covering the requisites of installation for switch indicators, specifically relates to the use of such indicators on roads of two or more tracks. After a careful study of the conditions obtaining on single-track, the committee presented the following statements of practice, with the recommendation that they be submitted to letter ballot for adoption, and if passed, be inserted in the Manual following the requisites of installation for switch indicators.

(1) Where there are signals governing movements in both directions located so near a switch that trainmen at the switch can observe their indications, such signals will give the necessary information and switch indicators are unnecessary.

(2) Where a signal governing in one direction is located as above and a signal governing in the opposite direction is not so located, a switch indicator may be used to give the information not obtainable from a signal.

(3) Where signals governing in both directions are not located as above, two switch indicators may be used, one for each direction.

(4) Each switch indicator may, as to trains in one direction, serve the same purposes and be controlled in the same way as on lines of two or more tracks.

(5) In the case of a system in which a train moving beyond one passing siding controls signals governing movements between that passing siding and the next, a switch indicator may be so controlled as to indicate the approach of a train at and from the signal located adjacent to the next passing siding.

A final report on the economics of signal maintenance was submitted, containing the following conclusions: Because the main controlling power of signal apparatus is electrical and because the special training required is so different, a combination of signal and track forces is not recommended as a means of obtaining economy and efficiency in signal maintenance. Occasionally it will be found practicable and economical to combine forces engaged in maintaining electrical features on a railroad with those maintaining signals; but as a general proposition economy and efficiency will be produced to a higher degree by co-operation than by combination, and this rests entirely with the officer in charge, in the arrangement of the forces available.

A monograph by F. L. Dodgson, consulting engineer of the General Railway Signal Company, was presented in connection with the report on the capacity of single-track. This paper analyzed the effect of passing siding location on the capacity of single-track and developed formulae for determining the theoretically correct locations of a given number of passing sidings on a given piece of single-track road to secure the maximum capacity in trains per day and for determining the theoretical number of trains that can be run with a given number and arrangement of sidings.

The committee recommended that a statement be inserted in the Manual to the effect that the recommended standard for limiting clearance lines for third rail and permanent way structures and rolling equipment, adopted by the American Railway Association, may be found in the latest issue of the Proceedings of that association. This action was considered preferable to reproducing the diagram in the Manual, because it is subject to revision by the A. R. A., and in case of revision a period of many months might elapse before the correct diagram could be placed in the Manual.

Discussion.—R. M. Phinney (C. & N. W.) presented, by letter, several suggestions on the proposed additional requisites for switch indicators, including a revision of the previously adopted clause, a combination of the first three paragraphs into one, and an alternative revision of the wording in paragraph 1, to cover the objection that, under certain conditions, the signals referred to do not give the necessary information. In view of the apparent merit in the suggestion the chairman, C. C. Anthony (P. R. R.), suggested that the subject be referred back to the committee and a motion to that effect was carried. In a brief discussion on the study of the relation of passing track location and line capacity, Mr. Dodgson said that further investigation led him to believe that lap sidings increase the capacity of a railway line three-fourths of a train per high speed train run, as compared with the capacity of the line when single sidings are provided.

MECHANICAL INTERLOCKING

Committee II presented a code of specifications for electro-mechanical interlocking. The discussion brought out a number of points in which the proposed specifications differ from the mechanical interlocking specifications, and for this reason the subject was referred back to the committee.

POWER INTERLOCKING

Committee III, on Power Interlocking, submitted specifications for fiber conduit, incandescent lamps and electro-pneumatic interlocking, which were recommended for submission to letter ballot.

The specifications for fiber conduit were referred back to the committee following numerous suggestions by Mr. Anthony based on quotations from the specifications of the Pennsylvania Railroad. The other two specifications were accepted with minor connections brought out in the discussion.

AUTOMATIC BLOCK

Committee IV submitted revised specifications for crystallized copper sulphate with a recommendation for its acceptance and submission to letter ballot. These specifications, as now revised, cover, in the opinion of the committee, a product which can be furnished by the manufacturers without an increase over present prices, and which will give the railroads a satisfactory article.

The specifications were accepted practically without change.

MANUAL BLOCK

Committee V submitted for consideration and submission to letter ballot the following codes of instructions: Testing and maintaining dry cells, maintaining gravity cells and maintaining

caustc soda cells. The report was accepted for submission to letter ballot.

STANDARD DESIGNS

Committee VI submitted 21 revised drawings and 6 new drawings, as follows:

No.	Title	Journal Reference
1010	Crank and Jaw Pins (New)	March, page 67
1015	One-inch Signal Pipe and Coupling	
1020	Guide Clamps, Brackets and Caps, etc.	March, page 68
1021	Guide Clamps for Vertical Connections	March, page 69
1022	Guide Supports and Caps for, etc.	March, page 70
1023	Guides for Vertical Connections on Signals	March, page 71
1024	Crank Bracket Fittings for Pipe Post	March, page 72
1025	Crank Bracket Fittings for Pipe Post	March, page 73
1026	Ladders for Mechanical Ground Masts	March, page 74
1027	Ladder Parts	March, page 75
1028	Ladders for Bracket Posts, etc	March, page 76
1029	Ladder Clamps and Stays	March, page 77
1043	One-arm Mechanical Ground Signal (New)	
1044	Two-arm Mechanical Ground Signal (New)	
1045	Three-arm Mechanical Ground Signal (New)	
1056	Terminal Blocks	May, page 145
1059	Clamp for Base of Ground Masts	May, page 146
1065	Blade for Upper-Quadrant Signals	May, page 147
1070	Binding Post	May, page 148
1196	Guides for Vertical Connection on Bracket Posts	March, page 78
1197	Two-lever Wall Machine (New)	
1198	Crank Brackets and Bracket Posts	March, page 79
1233	Mechanical Dwarf Signal Spectacle, etc.	Sept. 14, page 538
1360	Tang Ends and Screw Jaws	May, page 149
1361	Adjusting Crank and Assembly	May, page 150
1397	Two-lever Wall Machine (New)	
	Plate III, Symbols (Revised)	March, page 80

In addition to the above, drawing No. 1233, mechanical dwarf signal spectacles and lamp bracket support was re-submitted for approval.

The committee has under consideration the desirability of standardizing a switch-and-lock movement, arranging the fittings to make it universal so that the crank may be reversible on its pivot, thus providing the means of applying the movement to a lifting block derail by reversing the crank and admitting of the lock and operating rods being contiguous, which cannot be done with the present standard movement. The revised movement which the committee has under consideration would be more costly than some of the present smaller movements, and a short discussion as to the need of such a standard was therefore requested. The committee also has under consideration further revision of the approved signal symbols. The manufacturers have appointed representatives to confer with the committee on this subject. A sub-committee has been investigating the desirability of standardizing the sizes of roundels and lenses primarily to reduce to the minimum the number of sizes used. This sub-committee is also looking into the matter of standardizing hand lamp globes.

All of the plans were accepted for submission to letter ballot and several members spoke in favor of the proposed new switch and lock movement, offering suggestions for the committee's benefit.

RELAYS

Committee VII recommended that no changes be made in the present specifications for relays until a thorough investigation can be made to determine just what is needed. One of the important changes will be the standardization of parts. This matter has been referred to the manufacturers' representatives, with the request that they reach an agreement on as many parts as possible.

The committee is of the opinion, first, that the ideal relay should pick up and release at the same point, and that a practical relay can perhaps be made that will approach that ideal condition more closely than the present design; second, the energy required for operating the relay should be increased; the amount of current consumed in operating the relay should more nearly approach the total amount of current supplied to the track circuit; third, a more economical, though perhaps more costly, relay can be designed, one that will require less energy, or one that will give a wider margin with the same expenditure of energy. It is believed that a relay can be designed that will be practically free from failure to release because of broken-rail conditions, provided there is no serious interference from foreign current. An abstract of the results of tests made by various roads to determine the proper drop-away values for track relays was presented. Also, the results of a series of tests made at Purdue University on some four-point relays, one each from four different manufacturers. The resistance measured in these tests seemed to indicate that with the contact materials now in use, each contact should have a pressure of not less than 1½ ounces. The matter of material and dimensions for contact and contact springs has been discussed by the committee, and while this cannot be specified definitely, it is thought the same result can be obtained by specifying the contact resistance after a certain number of operations.

A series of tests made on the Buffalo, Rochester & Pittsburgh showed the resistance occasioned by an engine and a string of empty flat cars on the main line to be .000277 ohm, and with one truck of a flat car within the fouling section of a siding that was seldom used, to be .0382 ohm. In the latter case the signal for that block did not go to the stop position. These tests show the necessity for maintaining fouling sections in first-class condition if they are to insure adequate protection. In an investigation of the reasons for adopting the present standard four-ohm track relay, by James Anderson, signal inspector, New York Central, Lines West, the conclusion is reached that a low resistance relay will (one) readily detect broken rails; (two) be operative in places where low ballast resistance would make a high resistance relay inoperative, and (three) fail to release where conditions prevent a low wheel resistance from being maintained. On the other hand, a high-resistance relay will (one) readily shunt out with a high wheel resistance, (two) be inoperative in places where low ballast resistance prevails, and (three) fail to release with broken rails. The committee requested an expression from the members on the following points: (1) Is it desirable to express pick-up and drop-away resistance of all relays under 100 ohms, in volts, and mil-amperes? (2) Shall we adopt a maximum of .7 ohms resistance and a maximum average of .5 ohms, for 500,000 operations? (3) Shall we recommend the use of 4-ohm track relays of not more than four front contacts per relay? (4) Shall we continue the 4-ohm relay as a standard type relay? (5) Is it desirable to raise the drop-away point of the 4-ohm relay?

Discussion.—It was the sense of the convention that the questions raised by the committee should be settled by investigation and research rather than by discussion, and the members limited themselves, therefore, to discussing the methods used by the committee so far and the lines along which future investigation could profitably be directed. Mr. Anthony complimented the committee on the start that has been made and expressed the hope that it would be possible to determine that combination of the controllable features of the track circuit which will give the best results.

ELECTRIC RAILWAY AND A. C. SIGNALING

Committee VIII submitted descriptive data covering installations of alternating current signals on 19 steam and electric roads, and specifications for reactors for line and track circuits. It was also recommended that the committee be assigned the duty of re-editing all alternating current signal write-ups which it has furnished and all other prominent articles written on alternating current signaling, this material to be put in shape for publication for the information of the members of the association and others. The report was accepted without discussion.

STORAGE BATTERY AND CHARGING EQUIPMENT

Committee X submitted for acceptance as information data in regard to ordering lead stationary storage battery of types other than pure lead, also data covering typical cost of current for line charging storage battery. It was recommended that the description of storage battery, lead type, appearing in the Manual, be eliminated as obsolete and misleading, and not of sufficient importance to warrant revising. The committee presented for the approval of the convention and submission to letter ballot, the specifications for nickel-iron-alkaline storage battery, including the corrections requested at the May meeting. It reported that considerable work has been done on a com-

bined hydrometer and thermometer for stationary storage battery work, and it is hoped this will be ready for the association by another year.

The report was accepted without discussion.

ELECTRICAL TESTING

The special committee on Electrical Testing presented a progress report, with a request for constructive discussion for the guidance of the committee in future work.

Discussion.—Paul Dinkel (S. P.), G. K. Thomas (A. T. & S. F.), C. C. Anthony (P. R. R.) and G. H. Dryden (B. & O.) outlined the practice on their lines for the testing of circuits and apparatus. Mr. Anthony mentioned the use of a card record to show the result of tests of every single-wire circuit on some divisions of the Pennsylvania. W. H. Elliott (N. Y. C.) gave the following causes of insulation failures on the New York Central, as determined from a three-year record:

Mice eating insulation	50 per cent.
Broken conductors	30 " "
Bad joints	10 " "
Failure through mechanical injury	5 " "
Direct failure of insulation	5 " "

LIGHTNING PROTECTION

The special committee on Lightning Protection presented for the approval of the convention and for submission to letter ballot the following: Requisites for lightning arresters for signaling, requisites for choke coils for signaling, and specifications for vacuum-gap lightning arresters. The requisites were presented in revised form, after considering the suggestions offered at the last stated meeting. The report was accepted after a brief discussion.

CLOSING BUSINESS

The following officers were elected for the coming year: President, W. J. Eck, signal and electrical engineer, Southern Railway, Washington, D. C.; first vice-president, Charles A. Dunham, signal engineer, Great Northern, St. Paul, Minn.; second vice-president, W. H. Elliott, signal engineer, New York Central, Lines East, Albany, N. Y.; secretary-treasurer, C. C. Rosenberg, Bethlehem, Pa.; directors, C. J. Kelloway, signal engineer, Atlantic Coast Line, Wilmington, N. C.; A. H. Yocum, signal engineer, Philadelphia & Reading, Philadelphia, Pa.; J. C. Mill, signal engineer, Chicago, Milwaukee & St. Paul, Milwaukee, Wis.; and W. M. Vandersluis, signal engineer, Illinois Central, Chicago; nominating committee, F. C. Stuart, signal engineer, Elgin, Joliet & Eastern, Joliet, Ill.; Oswald Frantzen, supervisor of signals, New York, New Haven & Hartford, Boston, Mass.; P. F. Bikle, assistant foreman of signals, Pennsylvania Railroad, Johnstown, Pa., and J. P. Spoerl, signal foreman, Chicago & North Western, West Chicago, Ill. The Grand Hotel, Mackinac Island, Mich., was chosen as the place for the 1916 meeting.

ENTERTAINMENT

The annual dinner on Wednesday night was addressed by L. R. Clausen, formerly signal engineer of the Chicago, Milwaukee & St. Paul, and for several years one of the most active members of the association, and by Governor Spry, of Utah. The western team defeated the easterners in the annual ball game on Thursday afternoon by a score of 6 to 1. Other entertainment features included a trip to Emigration Canyon for the ladies, and to Salt Air Beach for the entire party, a special organ recital in the Mormon tabernacle and the annual ball.

S. A. A. ELECTION

At the annual business meeting of the Signal Appliance Association the following officers were elected for the coming year: Chairman, E. E. Hudson, Thomas A. Edison, Inc., New York; vice-chairman, E. M. Fisher, Fairbanks-Morse Co., Chicago; secretary-treasurer, F. W. Edmunds, Dressel Railway Lamp Works, New York; executive committee, L. Thomas, General Railway Signal Co., Chicago; J. M. Fitzgerald, Railroad Supply Co., Chicago; J. V. Westcott, Q & C Co., Chicago; J. Warren Young, Kerite Insulated Wire & Cable Co., New York, and F. C. Lavarack, United Electric Apparatus Co., New York.

THE FREIGHT TERMINAL*

By C. M. Himmelberger
Superintendent, Raritan River Railroad

The freight and passenger terminals of a large railroad system may be likened to an immense stomach in which the function of digesting and assimilating the traffic is constantly taking place. As in the process of digestion, there are many functions taking place simultaneously, but all co-ordinated with a single end in view.

The operation of a freight terminal has become an extremely important part of railway service. It might be said that it is far more important in its relation to the prompt handling of traffic than actual road service. This is due to the necessity for handling promptly voluminous traffic through numerous arteries in a congested district without the means of expansion found in other branches of the service, and a generally accepted practice of using the terminal district as a storage ground for all classes of traffic.

Successful operation depends primarily on a well-planned track layout. The operating officers may possess every qualification necessary, but their efforts will, to a large extent, be fruitless, if the design of the yard is such as to prevent the free and uninterrupted movement of the traffic.

To handle a freight terminal successfully demands an efficient organization, controlled by practical men, preferably those who have worked up through the ranks, and who have displayed ability to handle and develop the latent qualities of subordinates; men who are broad-minded, fair in their dealings with the public and employees, and who possess the necessary tact to protect fully the interests of the company without antagonizing shippers who are not familiar with the complex nature of the handling of traffic through a busy terminal.

The terminal trainmaster, the general yard master, and the freight agent should, from time to time, hold joint staff meetings, at which there should be representatives of all classes of assistants in charge of the distribution of traffic in the different districts of territories which comprise the general terminal district.

For the successful operation of a yard, the yard office should be supplied with a good card waybill rack, preferably along the lines of that recommended by Mr. Droege in his book on "Freight Terminals and Trains," which allows a quick selection of the card waybills desired when cars are ready for movement.

It has been contended that it is good practice to have the yard clerks (instead of conductors) in the initial yard prepare the train record for cars forwarded, and to hold them responsible for the condition of the cars, shipments, seal records, correct initials and numbers, and the accompanying card waybills, thereby relieving the conductor of work of this character, enabling him to move the train from a yard with the least possible delay.

This method is a most economical means of handling matters in connection with outbound movement of cars, as it eliminates holding an entire crew and the payment of their wages during the time that the conductor is checking his train and correcting the errors which may be found. Assuming that the average time of a crew, from the time it is called or arrives in a yard until the time of leaving, is approximately one hour, the saving in expense of holding the train for the purpose of checking is quite apparent when comparing the wages paid to a full crew, against the service of one yard clerk while engaged in this work. This practice is also of additional benefit, as it shortens the time classification tracks are occupied by trains.

The quick and successful operation of the terminal depends to a large extent on the ability of the general yard office force

* Abstract of a paper read before a meeting of the New York Railroad Club, September 17.

to furnish information at a moment's notice regarding the location of cars, and to know the time necessary to place cars promptly at industrial plants, piers and docks for outgoing steamers, etc.

Another important factor in the efficient operation of a terminal district is the close contact and co-operation of the car distributor, chief despatcher, general yard master and the terminal train master. The close association of the car distributor with the chief despatcher's office, thus giving him a thorough knowledge of the conditions of the territory, will enable him to distribute cars throughout the different arteries leading out of the terminal district to much better advantage than if there was not this close co-operation.

Discussion—The paper was discussed by a number of the members. T. F. McCarthy, trainmaster of the Lehigh Valley, said that conditions frequently made it impossible to increase the size of freight terminals in large centers and that necessary increases in capacity had to be brought about by greater efficiency of operation. This greater efficiency is to be attained primarily by organization. J. P. Bougher, chief clerk in the car record department of the Reading, emphasized the importance of the car record office and the necessity for accurate reports. W. E. Gordon, division trainmaster of the Central of New Jersey, at Jersey City, also emphasized the task of the operating officer in increasing the capacity of an inflexible yard layout. He also referred to the freight terminal problem in New York, and spoke of the value of outlying yards.

THE FIRST FRENCH BRIDGE BUILT IN WAR TIME

By Walter S. Hiatt*

An important work of peace has just been completed in France in the form of a new bridge across the river Seine at Rouen recently opened to traffic as a part of the railroad line from Paris to Havre.

This bridge is but one of the many pieces of engineering and construction work now going on all over France. Its completion is noteworthy not only because the bridge is the first important engineering job completed during this year of war on the continent, but also because it indicates how smoothly life goes on behind the battle lines in the Republic of France.

"Why build a fine new bridge when you may have to destroy it again for military reasons?" I asked one of the construction engineers of the government-owned Western Railway, to which line the bridge belongs.

"Why, the war is over so far as that bridge is concerned," he replied.

This work of peace was begun two and a half years ago; it was interrupted for a few months during the early part of the war; and then it was resumed with the result that the bridge was thrown open to traffic on July 21.

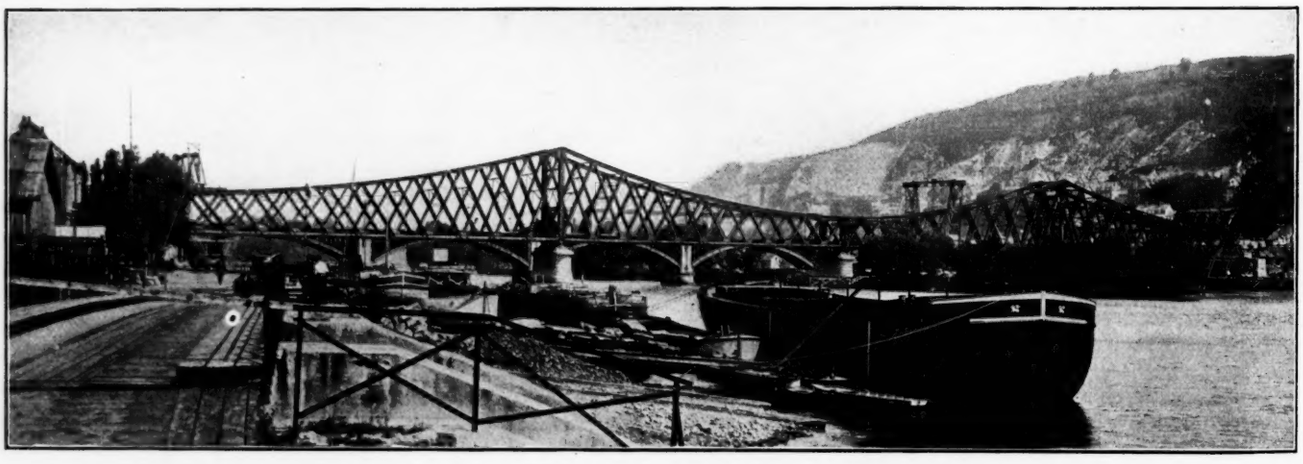
Otherwise the new bridge has a certain interest in that it replaces one built 70 years ago for the first railroad ever built between Paris and Rouen. The old bridge was built by the English, strangely enough, within a stone's throw of the place where William the Conqueror died. The English railroad and its bridge afterwards, in 1856, passed into the hands of a French company, that of the West, and this company was in 1909 taken over by the French government.

The old viaduct stone bridge, always termed the "English bridge," with its eight cast-iron arches, each 135 ft. long, had been in such poor condition for a number of years that but one train at a time was permitted to pass over it and then but slowly.

The government has been rapidly improving this line (which the stockholders and directors of the West company had gradually let deteriorate), beginning with the period when the government voted to take it over and make of it a state railroad; and this new bridge was one of the necessary improvements. Not only did the old one constitute an element of danger, as will be readily recalled by every American who has passed over it after leaving ship at Havre or who has been on a visit to the ancient city of Rouen, but it was an obstacle to the heavy traffic out of the Gare St. Lazare at Paris, which daily handles the largest number of trains of any railroad terminal in the world.

With the declaration of war and the heavy movements of English troops, of munitions of war and of hospital trains over the line, the completion of the bridge became yet more necessary.

The new bridge is 1,065 ft. long, some 165 ft. more than the width of the Seine at this point. One of its piers rests on the island of Brouilly, near the river's north shore. It is of the cantilever type, the steel superstructure being divided into four sections. The third one opens for a space of 285 ft. to permit the passage of vessels on the river Seine to or from Paris. The photograph is taken from the upper side of the bridge or from the direction of Paris, the city of Rouen lying to the left of chalk hill of St. Catherine, under which is one of the five old tunnels on this main line from Paris to Havre. A peculiar fact about these tunnels, which have not yet been widened, is that they still limit the size of the freight and passenger cars used throughout the West system. The tunnels were built small originally to accommodate cars not much larger than the old stage-coaches after which they were modeled.



New Bridge at Rouen, France; the Arches and Piers of the Old Bridge Which It Replaces May Be Seen in the Background

The French are rather proud of this bridge, not only because of its completion in war time, but also because the Pacific type locomotives may now be used for the fast trains. These engines are 90 tons in weight and haul 300-ton trains at a speed of 70 miles an hour. When the war is over and when coal is less scarce and passengers more numerous, it is planned to run expresses from Paris to Havre, a distance of 84 miles, in about two hours, instead of the three hours formerly required.

* Our special European correspondent.

Master Car and Locomotive Painters' Convention

Reports on Flat Color vs. Enamel Color, Metal Protection, and Design and Protection of Steel Passenger Cars

The forty-sixth annual convention of the Master Car and Locomotive Painters' Association was held at Detroit, Mich., September 14-16. H. Hengeveld, first vice-president, presided under the direction of T. J. Hutchinson, the president, who on account of illness was unable to carry on the physical duties of a presiding officer. The convention was opened with prayer, and the association was welcomed to the city by the mayor, Oscar C. Marx.

President Hutchinson, in his address, commented on the valuable work the Test Committee of the association has done in testing the various kinds of paints placed on the market for different classes of service. He favored further consideration of standard letters and numerals for stenciling all classes of freight cars, believing that there is yet much to be done in providing a more legible letter and numerals with the ultimate advantages of reducing the chances for error when recording car initials and numbers.

PREPARED PAINTS FOR METAL SURFACES

Henry A. Gardner, assistant director, The Institute of Industrial Research, Inc., Washington, D. C., presented an interesting paper on this subject, an abstract of which follows:

In designing protective coatings for metal the modern practice has been to apply the results available from researches into the cause of corrosion. These results have shown that materials of a basic nature, or substances which contain soluble chromates, prevent the rusting of iron. For this reason pigments of a basic nature or pigments containing the chromate radical have come into wide use in the manufacture of protective paints. That they are the best pigments for this purpose has been proved not only in practice, but also in the Atlantic City tests,* which were made on a series of 300 large steel panels, using nearly 100 different pigment paints. Applying the results of these tests to the practical manufacture of protective coatings, the writer will discuss the use of the various pigments under separate headings, taking up the composition of the most widely used colors for metal painting, namely, red, gray, black, and green. Most of the paints outlined herewith are suitable for the painting of structural steel, bridges, steel railroad cars and equipment, ornamental ironwork, poles, posts and for general work on metal surfaces.

Red Lead Priming Paints.—It is well understood that one of the most valuable properties of red lead is its ability to set up to a hard, elastic film that shuts out moisture and gases which are apt to cause corrosion. This cementing action is due to the presence of unburnt litharge, a pigment which rapidly reacts upon linseed oil to form a lead linoleate compound. It will readily be seen, therefore, that red lead free from litharge has no cementing action and should not be considered more protective than iron oxide or any other similar neutral pigment. It is thoroughly essential that red lead should be highly basic and should contain a considerable percentage of litharge, if it is to protect iron from corrosion. It is a growing custom to use prepared red-lead paints made from finely divided red lead ground to a fluid condition in linseed oil. Such paints remain in excellent condition for a long period of time. They have a high protective value and are well suited for general purposes. They are used extensively for priming steel vessels. The Navy Department has found that inert pigments, such as silica and asbestine, give good results when used in ready mixed red-lead paints, their action being to prevent settling of the red lead upon storage.

A specification which may be used by the grinder when purchasing dry red lead for the manufacture of prepared paints is given herewith:

1. The dry pigment to be the best quality, free from all adulterants, and to contain not less than 85 per cent nor more than 90 per cent Pb_3O_4, the remainder being practically pure lead monoxide (PbO).

2. It shall contain not more than 0.1 per cent of metallic lead, nor more than 0.1 per cent of alkali figured as Na_2O.

3. It shall be of such fineness that not more than 0.5 per cent remains after washing with water through a No. 21 silk bolting-cloth sieve.

NOTE.—If desired, the gram weight of the red lead may be specified. Extremely light, fluffy red lead should run from 10 to 13 grams per cubic inch. Medium red lead will run from 13 to 16 grams per cubic inch. Heavy red lead will run from 17 to 19 grams per cubic inch.

Composition of Red-Lead Priming Paints.—The cost of red-lead paints is a subject of vital importance to the large user. Red lead may be produced in different physical states. Ordinarily the grade that has been overburned is extremely heavy, 1 cu. in. weighing from 18 to 20 grams. For the production of a paint from such red lead, according to the formula used by one large consumer, the following quantities would be required:

Red lead	26 lbs.
Linseed oil	26 gills
Petroleum spirits	3 gills
Drier	3 gills

This would produce approximately 1 2/5 gal. of paint. Each gallon would contain about 20 lb. of red lead, the actual cost of the red lead itself being in the neighborhood of $1.60. A red lead of a much better protective value, containing from 10 to 12 per cent of free litharge and produced in an extremely fine physical state of comminution, so that 1 cu. in. would not weigh over 12 to 15 grams, would produce a paint of exactly the same body on the following formula:

Red lead	20 lbs.
Raw linseed oil	26 gills
Turpentine	3 gills
Drier	3 gills

This would produce approximately 1 1/3 gals. of paint, each gallon of which would contain about 15 lb. of red lead, the actual cost of the dry pigment per gallon being in the neighborhood of $1.20. Red lead of still lighter gram weight could be used, so that a still smaller quantity of pigment would be required per gallon of oil. The durability of such paints should compare favorably with those containing very high percentages of red lead of high gram weight. Pigments of an extremely light nature, such as lampblack, grind in very large quantities of oil, yet their films are more elastic and durable than many paints which are composed of much pigment and little oil.

Red Paints.—Iron oxide has always been one of the most widely used pigments for the manufacture of protective coatings. Oxides that are free from acid or soluble substances give the best results. There are many grades, from the brilliant Indian reds, containing 98 per cent, down to the natural mined brown shale oxides, containing from 30 to 60 per cent of ferric oxide, the balance being silica, clay, etc. Venetian reds, consisting of about equal parts of ferric oxide and calcium sulphate, are also quite widely used. It is customary to add to iron oxides from 10 to 20 per cent of zinc chromate, zinc oxide, or red lead, in order to make them rust inhibitive. Such red paints are widely used for application to tin roofs, metal siding and general structural steel. Red paints made from basic lead chromate (American vermilion), the pigment which gave the best results in the Atlantic City tests, would doubtless be the most economical in the long run, but the high cost will probably prevent their use to any great extent. The use of a percentage of basic chromate of lead in iron-oxide paints is to be approved.

Gray Paints.—Mixtures of white lead (basic carbonate or basic sulphate) and zinc oxide, tinted gray with carbon black,

*For full description of tests and further information see Proc. Amer. Soc. for Test. Mater., Vol. IX, 1909, pp. 203 and 204; Vol. X, 1910, pp. 79-86; Vol. XI, 1911, pp. 192-194; Vol. XIII, 1913, pp. 369-371; Vol. XIV, 1914, pp. 259 and 260.

are widely used for this purpose and give excellent results in every climate.

A valuable rust-inhibitive coating for general priming or finishing work may be prepared from sublimed blue lead. The use of two parts of blue lead and one part of linseed oil containing about 5 per cent of turpentine drier makes a paint of the right consistency. This may be purchased in prepared form. The rust-inhibitive value of this pigment is due to the high percentage of lead oxide (litharge). When purchased ground to a paste in 10 parts of oil, there should be added approximately 5 gals. of linseed oil and 1 pt. of drier for use. A specification for blue lead for use in metallic paints is given herewith:

	Minimum.	Maximum.
Lead sulphate	44 per cent	52 per cent
Lead oxide	33 per cent	40 per cent
Lead sulphide		0.5 per cent
Lead sulphite		3.5 per cent
Zinc oxide		3.0 per cent

Black Paints.—Black paints are often preferred for the finishing coat on steelwork, carbonaceous paints being unsuited for application direct to the metal on account of their rust-stimulative action. Carbon pigments, such as gas carbon black, oil black, artificial and natural graphite (flake and amorphous) are usually the base pigments used in black paints. Silica and other earth pigments may be combined with the carbon. The slow-drying nature of such paints is lessened by the addition of litharge. The use of boiled linseed oil as a vehicle is advisable.

Magnetic black oxide of iron (precipitated) forms an excellent black protective paint when ground in linseed oil. The slightly basic character of this pigment accounts for its inhibitive value. The natural variety of black magnetic oxide of iron is also suitable for this purpose, but should be tested for freedom from soluble acid impurities before use. Willow charcoal is not made in commercial quantity; its use, therefore, will be restricted. Its inhibitive value depends on the basic nature of the impurities present.

Green Paints.—Mixtures of zinc chromate and Prussian blue in oil are highly inhibitive and have proved satisfactory in long service tests. Chrome yellow tinted with black oxide of iron to an olive shade is permanent and protective. Chrome green made from lead chromate and Prussian blue is generally used when precipitated upon a barytes base.

Painting Galvanized Iron.—Roofing, siding, railing, drain pipes, cornice work, etc., constructed of galvanized iron require painting if they are to be kept in a good state of preservation. Paints are apt to peel from galvanized iron on account of the smooth, spangled surface. This condition, however, is obviated by first treating the metal before painting with a solution of copper salts. Such a solution may be prepared by dissolving 4 oz. of copper acetate, copper chloride or copper sulphate in one gallon of water. By brushing on this solution the galvanized iron is roughened, a thin deposit of copper being plated out over the surface. After an hour or so, the surface may be lightly brushed and then painted with a thoroughly inhibitive oil point. Firmly adhering films are thus produced.

Painting Tinned Surfaces.—Tin plate, such as is used for roofing and siding, will rapidly corrode unless protected by paint. The pin-holes present in the tin coating on the steel base metal act as pockets to catch moisture, which causes rust spots and pit-holes. Before applying paint to the sheets it is advisable to rub the surface of the tin with a cotton rag saturated with benzine or turpentine. This will remove the palm oil that is present on the surface and allow the paint to firmly adhere. Iron-oxide paints containing an inhibitive pigment are widely used for preserving tin. The use of 15 to 20 per cent of zinc oxide, red lead or zinc chromate with a neutral bright iron oxide produces an excellent paint. The partial use of boiled linseed oil or kauri gum mixing varnish will add to the gloss and water resistance. Such paints are also suited for use on metal shingles and pressed-steel siding—plain black, galvanized or tinned. For dipping purposes, turpentine or high boiling point mineral spirits should be used for thinning. Cheap driers containing a low boiling point benzine should be avoided.

TEST COMMITTEE REPORT

The tests conducted by the several Master Painters' Associations and Committee D-1 of the American Society for Testing Materials have given definite results that may be summed up as follows: First, a composition paint made from a combination of several pigments will give better results than a single pigment paint; second, the pigment contained in a paint should be selected to meet the requirements of the service and the nature of the material it is expected to protect; third, carbon is not a rust inhibitive pigment, and it is generally acknowledged that carbon paints do not make a good primer for steel but there is no doubt but what carbon paints make the best cover or body coating for steel structures exposed to the action of alkali or acids. Tests have proved that paints should be selected to meet service and climatic conditions.

The test committee this year devoted its time to the study of paint vehicles. It is believed that the efficiency of linseed oil for paint purposes can be greatly increased by different forms of treatment, and that treated oils properly thinned will produce better paint vehicles at reduced cost than can be obtained by the use of raw linseed oil. The committee conducted tests along these lines, preparing films from different grades of linseed and china wood oil. It was found that practically all of the air dried films absorbed a higher degree of water than the baked film of the same material, showing that the baking closes up the pores and binds the several coats together better than the air drying method. The committee contended that a heat-treated oil containing a precentage of volatile oil sufficient to make it flow freely, will give better protection to steel than an oil that absorbs a high percentage of water. The results of the tests on steel plates demonstrated this. In substantiation of these conclusions quotations were read from a paper presented by Maximilian Toch, published in the June number of the Industrial and Engineering Chemistry, and also a quotation published in the same journal from Henry A. Gardner.

The test committee consisted of J. W. Gibbons, chairman (A., T. & S. F.); J. McCarthy (G. T.); W. H. Dutton (L. V.), and W. A. Buchanan (D., L. & W.).

PAINT COLOR VS. ENAMEL COLOR

Two papers were presented on this subject, one by M. L. Shaffer, of the Pennsylvania, and the other by J B. Shuttleworth, of the Boston & Albany. Mr. Shaffer said in part:

It has been thoroughly demonstrated by tests extending over many years that the advantages in the use of a properly prepared varnish color are much greater than might be expected. In car work it has been the aim of the painter to make as elastic a foundation as possible, and experience has shown that if a color is applied that has been properly mixed with a rubbing varnish in the form of an enamel the general principle of elasticity is carried through the entire operation of painting.

There are many other distinct practical advantages which may be briefly noted as follows: First, the color being ground in varnish can be applied heavier and consequently will, especially on repair work, tend to fill up and repair any slight imperfections on the surface. Second, the varnish color will hold out the succeeding varnish coats much better than will a flat color. By the use of a standard varnish color one coat of clear finishing varnish may be entirely eliminated, thus saving not only the cost of such a coat but the labor cost of application. Third, owing to the nature of the varnish used in making these enamels the color is more permanent and much less likely to fade.

Mr. Shuttleworth spoke strongly in favor of the enameled color over the old flat color, substantiating very clearly the claims made by Mr. Shaffer.

DESIGN AND PROTECTION OF STEEL PASSENGER CARS

Two papers were presented on this subject, one by John D. Wright of the Baltimore & Ohio and the other by George War-

lick of the Chicago, Rock Island & Pacific. Mr. Wright said in part: Both the design and construction of steel cars have a direct influence on the paint coatings which are applied to protect the metal, and they in turn determine in a large measure the life of the vehicle. From observations made on steel passenger equipment cars that have been in service for some time it appears that steel roofs, decks, deck screens, sash and doors are the principal parts to be considered, so far as the relation of the design and construction to the preservation of metal is concerned. A canvas roof if properly applied and painted at the outset is more evenly preserved than the all-steel roof, and it can remain longer in service without being repainted. On the steel cars the deck screens are objectionable because they form pockets in which the gases from tunnels and the cinders and moisture may collect, finally destroying the paint coating and starting corrosion. They are, furthermore, objectionable because the corrosion, which takes place back of the screens, cannot be detected without removing the screen frame. The arched roof with ventilators is preferred to the projecting surfaces common with the deck or clere-story construction.

It is strongly urged that for both the exterior and interior finish of steel cars smooth, level steel sheets be used in order to reduce the number of coats of surfacer and the amount of glazing and puttying to be done, to say nothing of the sandpapering and rubbing necessary to secure a good finished surface. Rough sheets require too much paint material to make a level surface. From past experience it would appear that the steel window sash cannot well be protected by paint, and they do not seem to be an improvement over the wood sash for use in steel equipment. Steel doors have also given a lot of trouble, having rusted out entirely after a few years' service.

The following is an abstract of Mr. Warlick's paper: In the construction of steel cars the body should be as plain as possible. No countersunk rivets or butt joints should be used. Open corners should be eliminated as far as possible, as they will hold dust and moisture, ultimately causing corrosion. Sharp corners should also be eliminated, and the joints should be soldered inside and out. Better results would be obtained were the Gothic sash not used, and the deck should be plain without projections that will hold the dust, cinders and moisture. Roofs should be plain and without the standing seams; where the side and deck panels are used they should be bent in one piece. The arch type of roof is preferred to the deck roof on steel equipment for this reason. Better results will be obtained if the interior of the steel car is finished in wood, as expansion and contraction on the steel finish cause the paint to crack.

Discussion.—The members strongly favored smooth steel sheets, claiming that the extra cost of these sheets will be fully warranted from the painting and maintenance standpoint. Some roads use aluminum doors with good success. Other members also spoke strongly in favor of the canvas roof on steel equipment; others objected to the use of screens which have been applied in many cases in the same manner as on wooden equipment. Mr. Hutchinson called attention to the stainless steel, manufactured by the Firth Sterling Steel Company, which might offer a solution to some of the difficulties experienced where excessive corrosion takes place.

PRICE VERSUS QUALITY IN BUYING PAINT STOCK

W. O. Quest of the Pittsburgh & Lake Erie presented a paper on this subject, an abstract of which follows:

In many instances the secret paint mixtures which have been sold by reliable paint manufacturers, and have proved to be of the first quality, cannot be safely imitated, regardless of the physical chemistry or the claims of the maker of the imitation, whose usual effort is to make and sell his product at such a low price that it is almost irresistible to a close buyer. A large percentage of the successful and fast surfacing systems of today are the original productions of the railway car and locomotive paint shop, and as a rule such specialty paints are recognized for their merits and worth and not by the price for which they are sold. The labor for applying the paint, costing ever so much more than the very best of paint stock, makes the enforced use of a cheap and inefficient paint stock almost a criminal waste of valuable time and money.

Something new and cheap in the form of paint or varnish is at least dangerous until it has proved its worth. Mistakes in purchasing paint material can never be remedied without large expense. The painter should be consulted when a change of the quality of the paint is contemplated.

MAINTENANCE OF ENAMEL COLOR VERSUS VARNISH FINISH

Two papers were presented on this subject, one by E. B. Stair of the Atlanta & West Point, and the other by J. W. Quarles of the Chesapeake & Ohio. An abstract of Mr. Stair's paper follows:

When considering an exterior finish of enamel or varnish color compared to the regular varnish finish it can be said that the former will not wear or clean as easily and economically as the latter. With the enamel or varnish color the same luster is not obtained as with the clear varnish of a good quality. Several years ago a body enamel Pullman color was used on the exterior of several coaches, and it was found that the working qualities of the product were such that it was anything but a pleasure to apply, and the appearance of the job was not as satisfactory as that obtained from the varnish finish. It also did not wear as well, nor did it clean as easily nor as cheaply as the varnish finished job. We had some postal cars finished on the interior with white enamel and it proved to be more expensive to clean than cars finished with a varnish over the enamel, as the dirt penetrated into the enamel, requiring considerable rubbing to get it out.

The following is an abstract of Mr. Quarles' paper:

There is no question but that the varnish finish will give much better service as regards wear or durability, where the varnish is of a grade as good as the enamel or varnish color. The enamel or varnish color being soft and easily cut will wear out more quickly with the friction of cleaning than will the varnish finish. Any color pigment or matter mixed with the varnish is certain to weaken the elasticity according to the strength of the coloring matter required to produce an opaque varnish color. If a low grade of varnish is to be used in finishing, the good grade of enamel or varnish color would be preferred on passenger equipment.

PROTECTING STEEL WITH PAINT

P. J. Burns, foreman painter of Hoboken shops of the Pennsylvania, read a brief paper on this subject, an abstract of which follows:

The initial rusting of steel invariably commences on the sharp edges and minute projections existing on iron and steel surfaces, which proves that it is practically impossible to obtain a uniform protection when a brush is used in applying the paint. The lasting qualities of the "smalted" signs are well known. We have come to the conclusion that by substituting a very fine sawdust for the sand, using it in the same manner, and by painting over the sawdust we can secure a very much better metal protective coating. This might be carried farther by having a coating of fresh paint with a substance that will completely cover the metal and fill up all the small holes and cracks, cover the rivets and in fact form a ground for the subsequent coating. There is a large variety of materials that may be used, such as abestine, cement or any inert pigment. The finishing coat can be made very heavy and applied freely so as to completely cover the material.

INTERIOR FINISH OF STEEL PASSENGER CARS

A paper by J. C. F. Kunkel, Pennsylvania Railroad, discussed the most practical and economical method of maintaining the interior of steel passenger cars, whether grained or painted, appearances being considered. Mr. Kunkel outlined several of the troubles experienced with paint on the interior of steel cars, stating that the more elastic the protecting coat the better would be the result. He recommended the straight color finish instead of graining or stippling, as the marred parts of the

car can be repaired with far less expense and time, the color to be of a light tint, which will not require a high finish and will not show irregularities so prominently.

Discussion.—Several members stated that they had found it very difficult to make satisfactory repairs on the interior of the car where it was stippled or grained. For that reason the straight color finish is strongly favored, some members advocating the wood interior finish for that specific reason. However, as the steel equipment has not been in service sufficiently long, no definite action was taken on this subject.

OTHER BUSINESS

The following officers were elected for the ensuing year: President, H. Hengevelt, Atlantic Coast Line; first vice-president, John F. Gearhart, Pennsylvania; second vice-president, J. W. Gibbons, Atchison, Topeka & Santa Fe; secretary-treasurer, Albert P. Dane, Boston & Maine. The secretary reported a membership of 292. Wilmington, Del., received the largest number of votes for the next place of meeting.

A BANKER'S VIEW OF THE RAILROAD QUESTION*

BY A. B. LEACH

President, Investment Bankers' Association of America.

Through our membership there has been placed in this country and in Europe a very large percentage of all of the railroad bonds and stocks, the proceeds of which have served to build up that magnificent system of transportation lines which this country has been proud of. Savings banks, insurance companies and the general investment public are the owners today of these securities, while a considerable proportion of them is held abroad. In view of this situation a very strong and able committee of our members attended a session of the Interstate Commerce Commission when the eastern railroad rate question was under consideration. They presented, with all possible emphasis, the investor's position in relation to the rate question, that the railroads should be granted the increase asked for. Whatever may have been the errors or failures or mistakes of mind or purpose in the issuing of some of these securities, the fact remains that the railroads have become a very important, if not the most important, industry of this country and the investments in railroad securities form a very large percentage of the security for the savings of our people in more than one way. The railroads today are facing new conditions. They face them—

In the character of the service they are called upon to render;

In the enormous volume of freight and passenger traffic to be handled;

In the new equipment necessary; safety appliances prescribed by commissions;

In the always pressing need of new terminals, additional tracks and sidings.

The Interstate Commerce Commission seems to place great stress upon the need of physical valuation of railroads, and seems to believe that the physical valuation should be made a basis for the interest return upon the capital actually shown in physical property today and the rates should be made on that as a base.

I submit to the just and reasonable consideration of the American people, and primarily the American shipping and business men, whether in any business in which we are connected, which has taken a number of years to build up, it would be fair to make its valuation depend absolutely on the physical property available. Vast sums of money have been spent not only in development, but also for intangible assets. I do not mean now that necessarily we should capitalize franchises and rights, for from the commission's viewpoint these rights and franchises are not an asset, but are available only to earn a deficit. The physical valuation of the railway properties will cost a large sum of money (running into many millions), but it will be of little value and practically obsolete when completed, and serve but a small purpose in just and reasonable rate making. The difference to the farmer in the sale of his products, the difference to the merchant in the cost of his goods, the difference to any shipper in the advance of rates requested by the railroads, is so small that it is practically a negligible quantity.

May I not submit, too, that the watchword of Americans and America is "progress"? The past of each and every one of us is full of mistakes and regrets. Today let us have confidence and feel assured that from our errors and mistakes of the past we can reach to higher levels of progress and development for our country and our common good. Whatever the railroads' history in the past has been signifies but little at present to the railroads and the communities they serve unless it teaches us fair treatment for each other and common efforts for the common good.

Let us not forget that the railroads are furnishing the life currents of a large portion of the country; they are the largest employers of labor, they are the largest purchasers of supplies and materials, they constitute one of the greatest, if not the greatest, of American industries. The Interstate Commerce Commission—I find no fault and make no criticisms, but simply make the statement—was appointed not alone as guardian of the shipper, but also as the guardian of the railroads, and if our railroads are to succeed, a new vision and a new disposition on the part of this commission and of the state commissions must be brought about by the pressure of public sentiment, by the pressure of business, by the pressure of the investor.

In this great West the need for additional railroad facilities, additional mileage, is felt constantly. Increased railroad facilities can do more—and will do more—to develop the country than any other one agency. Take away from the investment world the confidence in railroad securities, the staunch belief that investments in railroads will always receive fair treatment, and the railways of the country face bankruptcy. I could name a long list of railroads which have fallen by the wayside, and are now in the hands of receivers, and although I will agree with the most radical as to the mistakes or errors—and crimes, if you will—that have been committed in the handling of some of these properties, I will say to you, nevertheless, that today is the time to forget; let us leave the past behind.

The new thought that is in the mind of the railroad managers today is explained by the plan of the Atchison management, carried out by what is known as the "Harmony Special." The railroads are prepared and ready to meet the public on a fair basis, on the basis of service, on the basis of mutual justice. But the public, and public sentiment, should meet the railroads in a similar manner.

What would it benefit the state of Colorado, what would it benefit the country as a whole, if as a punishment of the sins of the past the railroad mileage of the country were forced into the hands of a receiver, if lack of confidence in this great American industry is abroad and consequently new developments cease? I insist there is none. I would like to leave with the convention, I would like to leave with the state of Colorado, I would like to leave with the vast western world, of which I am proud to be a son, the thought that the day has come for a new alinement of public thought, and of public effort, when we shall all join, the shippers, the railroads, the investment world, on the basis that with the conditions of today the need for fair treatment accorded to the railroads is imperative, and that from today on the public should give the commission and their servants to understand, if recent developments have not already taught that lesson, that what this country needs is service, what we need is good equipment, what we need is railroads prepared to push developments, and this can only be realized by such fair treatment of the railroads as will restore the confidence of the investment public. Until that time, and I believe and hope it is coming nearer every day, we shall not get back that degree of prosperity of which this abundantly resourceful country, when given a fair chance, is capable.

* From the President's address to the Investment Bankers' Association at its annual convention at Denver, Colo., on September 20, 1915.

Recent Progress in the Federal Valuation Work

The Methods Are Being Revised and Standardized and Increased Results Secured in All Departments

With the covering of 3,870 miles of line by the federal roadway and track valuation parties in June, and 4,060 miles in July, Director Charles A. Prouty feels assured that his original estimate of 50,000 miles of road valued per year will be reached and maintained from now on, and that the field work will be completed by January 1, 1920, the date originally set. This is borne out by the fact that the progress noted above has been made in a season of unusual rainfall with correspondingly heavy interference with field work and also by the fact that increased efficiency may be expected from month to month as the men become increasingly familiar with their duties. The original estimates of the director were based upon the placing of 16 roadway and track parties in each district, but in view of the progress which is now being made with 12 parties in each district, it is doubtful if the additional parties will be required to cover the allotted mileage. It is not considered advisable to attempt to cover much in excess of 50,000 miles per year because of the large amount of incidental and office work which must keep pace with the field work.

The amount of line which may be covered properly by a roadway and track party in a day is a difficult one to determine. It is to the interest of the government and the railroads alike, that, having started, the work be completed as soon as possible. In view of the expense to the government, there is also a desire that each party cover the maximum number of miles per day. In some instances this has led to complaint on the part of the roads that the work was being done too hastily and that the data was not being collected in sufficient detail to show all the property of the carriers. The exact point to which this detail should be carried is hard to determine, as there is a wide difference of opinion among railway men themselves. In many instances the government forces are grouping the component units of an article into one item, believing that even if the estimates of individual units vary considerably, the average will be correct within all practical limits. At the same time, increased attention is being given to this subject and the men are being furnished with information showing the relative values of the different units making up the whole.

On September 1, roadway and track parties had completed the inventory on about 30,000 miles of road and 40,000 miles of track. Field work has been entirely completed and tentative reports have been prepared for the commission on a number of roads, including the Texas Midland, the New Orleans, Texas & Mexico, the San Pedro, Los Angeles & Salt Lake, and the Atlanta, Birmingham & Atlantic. Among the larger roads on which roadway and track parties are now engaged are the Boston & Maine (6 parties), the New York, New Haven & Hartford (3 parties), the Big Four (5 parties), the Pere Marquette (4 parties), the Illinois Central (4 parties), the Chicago, Rock Island & Pacific (8 parties), the Great Northern (8 parties), and the Chicago, Milwaukee & St. Paul (4 parties).

Excavation Across Embankment Showing Extent of Settlement

Awaiting the receipt of the information requested from the roads in Vaulation Order No. 14, dated February 9, 1915, regarding unit prices, no values have been assigned to the units of materials. The government computers have the quantities

figured closely up to the field parties and have entered these quantities on the final summary sheets, so that on the determination of the unit prices, it will be a comparatively simple problem to apply them to these quantities and to arrive at the cost.

REVISION OF FIELD METHODS

With the expansion and increased experience gained with the continuation of this work, important modifications in methods are being made. One of the most important changes has been in the adoption of the "type" method of making the field inventory on the Boston & Maine, and later on the Pennsylvania and other roads. With this method many details are grouped into types, corresponding to the standards of the road under valuation. With many items such as culverts, concrete box drains, turnouts, etc., this can be done readily. It is only necessary then to designate the types and to measure the special dimensions of the individual units, as for instance, the length and diameter of concrete pipes, when taking the field notes. Unit quantities are established for these various types, which also reduce the computation work materially. With the adoption of the "type" method on the Boston & Maine, a special form of notes was adopted, providing for the computation of all quantities on the original data sheets. These sheets are made in duplicate and one copy is furnished to the road. In this way it receives a duplicate of the original field notes and computations rather than an entirely separate copy.

Another method followed extensively on the Boston & Maine is that of making borings in embankments wherever there is any indication of settlement. Many of the lines along the coast cross salt marshes, while other lines further inland pass over fresh water swamps. The settlement in such banks consists in compressing the water out of the upper strata of the original ground without creating the mud waves frequently found in other parts of the country. A chance excavation across an abandoned embankment revealed the condition shown in one of the accompanying photographs. In this particular instance the original ground line had settled 1½ ft. under an embankment only 3½ ft. high.

Because of the prevalence of this condition, the carrier secured two wash boring machines and borings are now made in embankments at all points where it is thought that such settlement may exist. These outfits follow at some distance after the roadway parties and make borings either in the center of the track or on the shoulders of the fill at points designated by the pilot with the roadway party. A government inspector accompanies each wash-boring party and the carrier will insist that all extra quantities discovered in this way be added to the original yardage figures. Another deviation from the original methods of organizing roadway and track parties is in the formation of such parties jointly by employees of the government and the carrier. On the inauguration of the valuation work, all field notes were taken by the government forces and the railroad furnished only a pilot with each party to point out to the government engineers all elements of value. Where a road desired to secure its own data to check the government figures, it made an entirely independent survey, creating a duplication of work. Largely to avoid this the Boston & Albany and the government have organized a joint party composed of two government and the remainder railroad employees. As worked out on this road, one of the government men is chief of party and the other is the recorder taking the notes. The railroad receives a copy of all notes taken. In addition to avoiding duplication of work, this method has the advantage from the standpoint of the government of reducing materially the costs of the surveys, while from the railroad standpoint the employment of a large number of the party gives a closer control over the speed and accuracy of the work and insures that the work be covered in sufficient detail to meet its desires. A similar method has been worked out for two parties on the Big Four. On the Chicago, Rock Island & Pacific, this plan has been further modified to two parties on the Chicago terminals so that the railroad puts on the entire parties and takes all notes, and the government only sends a pilot with each party to see that the work is performed in accordance with the government standards and to receive a copy of all notes taken. These will be checked later by the government so far as may seem necessary.

In general, the lines originally established to divide the country into five districts are being adhered to with the exception that when one district undertakes work on a line, the general principle has been established that this district will continue the valuation on that road, even though this takes it into other districts. This eliminates the necessity of one railroad dealing with two or more district organizations. Thus, the Eastern district is planning to cover the Baltimore & Ohio system as far west as Chicago and St. Louis, crossing the southern and entering the central districts. The Southern district has already covered the lines of the Big Four in Illinois in the central

Wash Boring Outfit to Determine the Amount of Settlement of Embankment

district. The Western district is valuing all lines of the Rock Island outside of the Chicago terminals, although a large portion of these lines lie in the central district, while the Pacific district is covering all the lines of the Great Northern as far east as Duluth.

Wherever practicable, the roadway parties depend upon train service to carry them from their camps to work and no motor cars are provided for them. The bridge, building and signal parties are supplied with motor cars, as their work is more scattered.

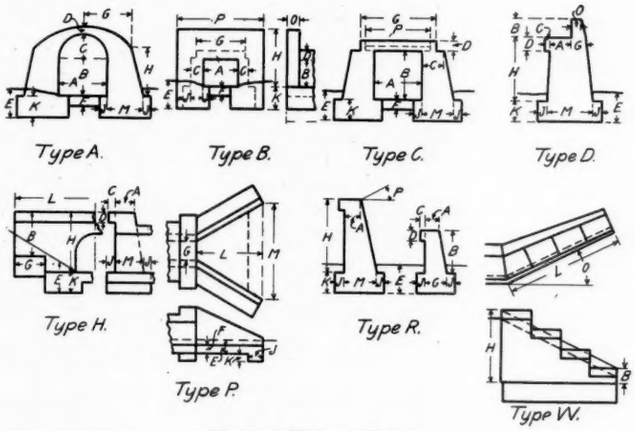
BRIDGE, BUILDING AND TELEGRAPH WORK

It has not been definitely decided at this time whether in valuing the buildings, this valuation should be based upon unit prices per cubic foot of volume or per square foot of floor area, or on a detailed inventory of materials. This subject is now receiving the serious consideration of the government officers and definite instructions will be issued in the near future. At the present time the method followed in the central district is based primarily upon a bill of material. Where standards exist on the different roads, bills of material are made up carefully for these and applied so far as practical to structures found on the line. The detail with which the notes are taken in the field depends upon the extent to which the buildings be-

ing measured conform to standards. In addition to sketches, photographs are used freely to elaborate the notes.

Previous to sending bridge parties out over a line, officers of the government go to the offices of the roads and secure essential data regarding bridges, including the sizes and the dimensions of the various members from the plans. This information is furnished to the forces in the field, who check these dimensions with the structures and note any inaccuracies. With a complete set of plans in the office, it is possible to reduce very materially the field work of the bridge parties in this way. In general, one bridge man, one building man and one helper, accompanied by the pilot of the railway company, go over the line as one party.

In some instances it has been found economical to combine the signal and telegraph parties, as in this way all the necessary data for both departments can be secured by passing over the road once. Before starting on a road, the telegraph and



Typical Culvert Types

railroad companies are called upon to agree as to the ownership of all lines. The government then makes its valuation on the basis of this agreed ownership. On heavy lines a walking inventory of the telegraph lines is taken, noting carefully the condition of typical units. One feature which is requiring particular attention from this department is the condition of the iron wire, the quality of which has undergone material change in recent years.

MECHANICAL INVENTORY

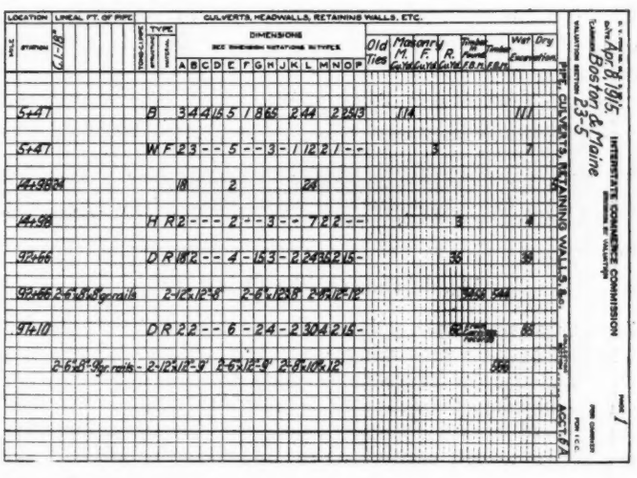
Another phase of the valuation work in which material progress, has been made in the past few months is in the inventory of equipment. In general, these classes of mechanical parties have been organized, locomotive, car and shop equipment parties. Each of these parties is composed of one government and one railroad employe, both of whom have been selected because of their general experience in this field. As a rule, men of the grade of general foremen or higher have been assigned to this work. These men agree regarding the condition of all equipment inspected and make a joint inventory. Comparatively little difficulty has been encountered in securing agreement as to the various details.

Not less than 10 per cent and as high as 25 per cent of the total number of freight cars in each series are being inspected, the percentage depending on the number of cars in the series and their condition. Obviously the smaller the number of cars in any particular group, the larger is the percentage inspected to get accurate data. As a general principle, it has been the practice to continue to inspect cars of a particular group until both parties felt that representative data had been secured. Most of the cars are inspected in the terminals, although they are caught wherever possible, and in some instances where the number of cars in any particular group were small, it has required a careful search to locate a sufficient number. The existence of cars not inspected is verified from records of recent movements taken from the car accountant's records. In examining work equipment, such as pile drivers, steam shovels and cars engaged in ballast service, it is necessary to go over the entire line. At the present time the government is not valuing the property of private car lines, including the Pullman Company and the various fast freight lines, although this will probably be taken up at some time in the future.

All passenger equipment is being inspected, including sleeping cars and similar equipment, where owned directly by the road. In inspecting passenger and freight cars they are considered in three parts, the body, the underframe and the truck, and notes of their condition are taken accordingly. The age of each series of equipment is also available from the records of the carrier.

All locomotives are examined in detail, whether on the lines of the owning carrier or not. On the New Orleans, Texas & Mexico, the larger part of the locomotives were off the line of the owning company and it was necessary for inspectors to go to this latter road to make their inventories.

In listing shop equipment, a number of the carriers have pro-



Typical Form of Field Notes for Culverts, Using the Type Method

vided the government with detailed registers of their materials. The government employees check this against the equipment found in the shops as of the given inventory dates, take condition notes and secure the age of the equipment from the records of the carrier.

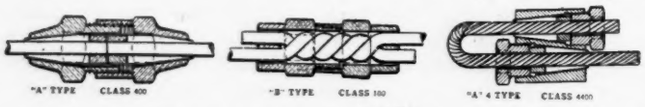
Aside from the completion of the valuation work now in progress, the law requires that this be kept up-to-date after it has been completed. One of the problems now confronting the government is the organization of a force to continue the revision of the records on those roads on which the work has been completed. This will require the organization of an additional force of considerable magnitude, as the latter problem is no small one in itself.

TRANSCONTINENTAL LINES IN SOUTH AMERICA.—Transcontinental traffic over the South American railway line extending from Buenos Aires to Valparaiso is still interrupted by winter storms, and blocked along the route in the mountainous regions, especially in the Chilean section. This unusually long suspension of through business on this occasion has led to an increased discusion of a second line for Chile. An alternative route from Argentina to the Pacific seaboard would be by the railway line extending in a northwesterly direction from Buenos Aires connecting with the railway system of Bolivia, and thence by existing lines to the Pacific. Work on the proposed line from La Quiaca, which lies on the boundary line between Argentina and Bolivia, to Tupiza, Bolivia, has just been begun, and it is hoped that this will within a comparatively short time give to South America a second transcontinental line.

FARGO'S CABLE CONNECTORS

The illustrations show typical designs of strong and well made connectors which have recently been brought out by the Fargo Manufacturing Company, Poughkeepsie, N. Y., and which have found favor on a number of railroads for both telegraph and signal wires.

Type "A" (Fig. 1) is a compression device by means of which the butt ends of cables are brought together so tightly at the joints that the conductivity secured is practically as high



Figs. 1, 2 and 3—Fargo Clamps

as if the metal were actually welded together. In type "B" (Fig. 2) the ends of wires or cables are twisted together in much the same manner that a lineman makes connections, except that the work of twisting is done by means of a wrench. The result is that each joint is uniform, with the least expenditure of time and skill. With either type of connector there is no dependence on the case as a conductor. Both types are made in a variety of forms.

The compression type of connector is made up of two coup-

Fig. 4—Ground Wire Connection

lings or sleeves, male and female, and two cone-shaped grips with composition ends where they grip together. The cable ends that are to be connected pass through these gripping cones and when the couplings are screwed together the grips are wedged against the cables. At the same time the grips are drawn toward each other, so that the cable ends can be pressed one against the other as tightly as may be desired.

The type "A" connections are used also for guy wires, span wires, and, in fact, for all uses where cables are ordinarily spliced. In one design of steel cable grip the gripping cones are set side by side in a single casting, the pressure on the cable being applied by stuffing boxes that are screwed against the ends of the gripping cones (Figs. 3 and 5).

A simple and compact design for fastening a wire to a ground point, as used for lightning arresters, and for ground wires on poles, is shown in Fig. 4. The upper end (left in the picture) has a type "B" connector, and the lower end type "A."

With all these designs much time is saved in installation as all the work involved is pushing the cable ends into the grip and then screwing up several turns on the male casting. One lineman is said to place one of these cable grips in six minutes. The connections are made either with single or with double grips in series.

The same general principle is applied to cable locking, bus-bar

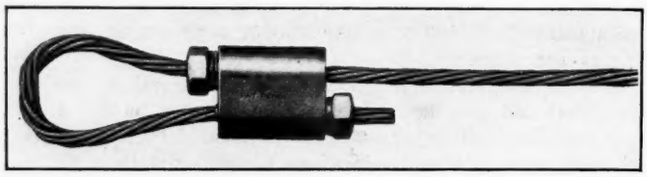


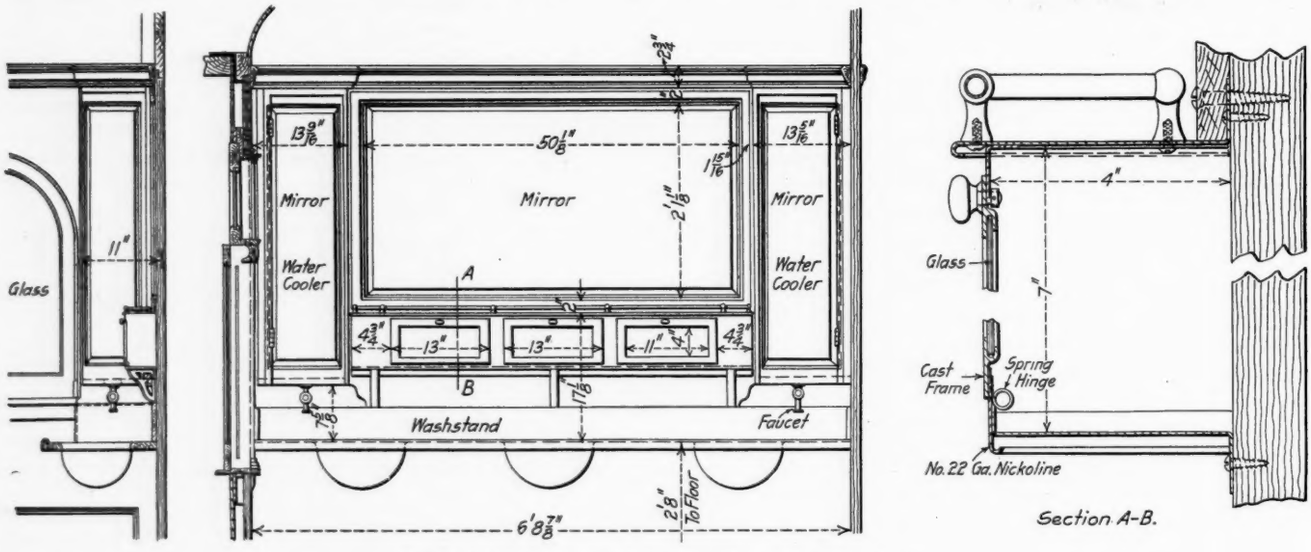
Fig. 5—Fargo Clamp; Type A4400

connections, guy terminals with bolts that thread into the dead-ending insulator, terminal connections, ground points and even wye, ell and tee connections. These various devices are made up merely by changing the shape of the casting that takes the place of the coupling in the straight cable connection.

Type "B" is made in practically all the forms suitable for the type "A" construction. Connections of this type are made for either single or double joints, the latter being provided for by an extra section of couplings with a central diaphragm containing two holes for the cables. This forms the joint in two twisted sections in series with each other.

SLEEPING CAR TOWEL RECEPTACLE

When towels are placed in the overhead racks ordinarily used in the toilet rooms of sleeping cars they are likely to collect more or less dust and become saturated with the odor of coal smoke. In order to avoid this, the Canadian Northern is using in its sleeping cars a closed receptacle for towels, as shown in the drawing. This is of metal construction, with glass doors in front, and is placed directly over the wash basin



Closed Receptacle for Clean Towels in Sleeping Cars

in the toilet rooms so as to be most convenient for passengers. The doors are provided with spring hinges so that they close automatically.

This towel cupboard was developed in the office of A. L. Graburn, mechanical engineer of the Canadian Northern, Toronto, Ont.

General News Department

The locomotive forces at the Terre Haute (Ind.) shops of the Vandalia have been working on full time—54 hours per week—since the first of the month. The men in the car department have been working on this basis for some time.

The Wabash Railroad has made advances in the wages of station agents and telegraphers, to begin November 1, amounting to nine per cent. The 12-hour work day for agents will in most cases be reduced to ten hours. The overtime rate of pay, 25 cents an hour, will be advanced to 35 cents an hour.

The valuation committee of the National Association of Railroad Commissioners is circularizing the different state railway commissions with the idea of organizng a bureau at Washington to represent the state commissions in connection with the Interstate Commerce Commission's valuation of railroad property.

The express messenger on train No. 25 of the Lake Erie & Western, arriving at Indianapolis on the evening of September 15, reported that near Arcadia, 28 miles northeast of Indianapolis, he had been robbed. The single robber, after intimidating the messenger with a revolver, is said to have carried away money and jewelry valued at several thousand dollars.

The waiting rooms in the stations of the Nashville, Chattanooga & St. Louis are to be adorned with pictures of interesting views and agricultural scenes along the company's lines. Several hundred pictures have been made and will be enlarged and framed. The idea is not only to turn the prospective passenger's mind toward agriculture and show him the possibilities of the territory through which he will shortly be traveling, but also to brighten the appearance of the waiting rooms and break the monotony of the usual tariffs and time tables.

The New Hampshire Public Service Commission held hearings at Concord this week in connection with its investigation of the affairs of the Boston & Maine. Testimony was given to the effect that since January 1, 1912, the expenditures of the railroad in New Hampshire to influence legislation have amounted to $841,267, of which $258,132 went for payments to attorneys and $116,811 for advertisements. Over $25,000 is said to have been spent in a campaign in opposition to the extension of the Grand Trunk southward, through New Hampshire toward Boston.

The United States Civil Service Commission announces examinations October 20 for the following positions in the department of valuation of the Interstate Commerce Commission: junior architect, junior structural engineer, junior telegraph and telephone engineer, junior signal engineer, junior mechanical engineer, junior electrical engineer and junior civil engineer. Candidates for all these offices must be between the ages of 21 and 36, and the salaries range from $720 to $1,680 a year, except for junior architect, where the salaries will range from $1,200 to $1,680.

The Lehigh Valley Railroad, following the example of the authorities of the Pennyslvania Railroad and the city of New York, has made a thorough physical examination of all persons having to do with the preparation or serving of food in public places—that is, of all dining car employees. One hundred per cent. was the condition reported. The examination included also the workers in the headquarters of the dining car department at Easton, Pa. The company had its own surgeons make the examination, and a strict standard, including personal cleanliness, was adhered to. These examinations will be made periodically.

The Maryland State Industrial Accident Commission has reopened the question whether it has jurisdiction in cases involving accidental personal injuries to railroad employees engaged in interstate commerce, where the accident was not caused by the negligence of the employers. Some time ago the commission decided in the negative. A section of the Maryland compensation law provides that no compensation shall be paid in cases where the Federal Employers' Liability Act applies. But the federal act provides compensation only in case of an accident where the railroad shall be found negligent. The Maryland act provides compensation in all cases except where it shall be shown that the employee caused the accident. The question arises whether the Maryland law applies in cases of accident to an interstate employee where the railroad cannot be shown to have been negligent.

Strikes of laborers occurred this week at a number of freight stations in New York (Manhattan) and at Weehawken and Communipaw, on the New Jersey side of the Hudson river. At the waterside stations of the New York Central, at Sixtieth street, New York, 250 men struck for an increase of 50 per cent in the rates of pay for work done on Sundays and holidays; and the demand was granted. Several hundred freight handlers at the Baltimore & Ohio terminus on Staten Island struck. There were strikes of freight handlers at the Lehigh Valley station in Communipaw. About 300 men in the freight houses of the New York, New Haven & Hartford at New Haven, Conn., struck on the 16th. There appears to be no general organization and it was expected that the trouble at New York would be short lived, many new men having been taken on; but embargoes on perishable freight were placed by two roads on Wednesday.

Employees' Life Insurance on the Brooklyn Rapid Transit Lines

The announcement of the Brooklyn Rapid Transit Company, Brooklyn, N. Y., that over 5,200 of its employees had applied for insurance under the plan of group life insurance, which was announced last July, was noticed briefly last week. This insurance is secured by a special arrangement with the Travelers' Insurance Company, of Hartford, Conn. The insurance became effective September 15. Inasmuch as more than 5,000 employees (65 per cent of all those eligible) have applied for the insurance, no physical examination will be required. Employees who are now eligible for the insurance as the result of having served two years in the employ of the road will be allowed until January 1, 1916, to come into the group without physical examination. After that date any employee who was eligible for the insurance prior to September 15, 1915, will be admitted to the group only upon a physical examination. In the case of employees who become eligible for the insurance hereafter, by the completion of their two years of service, the arrangement between the railroad company and the insurance company provides that such employees may be admitted to the group without physical examination if they apply for the insurance within six months after the date upon which they become eligible for it.

The applications thus far received call for aggregate premiums of $56,000 a year. One half of this is paid by the employees and one half by the road.

The circular issued by the company says that this insurance is the cheapest life insurance that has ever been offered under a group plan toward which the employee contributes. For employees under 32 years of age the share of the premium which they will be called upon to pay (for $1,000 insurance) will be about 7 cents a week. The premium increases slightly as age advances, but these increases are small. For example, those 50 years old pay a little over 13 cents a week; those 60 years, 26 cents. As before announced, a faithful employee, retired under the company's pension plan, will obtain what is equivalent for him to a paid up policy for $1,000.

Special privileges have been obtained whereby any employee leaving the road may within a limited time obtain any one of the regular life or endowment policies issued by the insurance company without physical examination. Employees who are insured in the group not only are not penalized in case they leave the service and thereby drop out of the B. R. T. group, but are placed in a better position than if they had undertaken to insure as individuals at the age when they insured with the group, for in that case they would have had to undergo a physical examination.

Railway Revenues and Expenses for the Fiscal Year

Total operating revenues of the railways in the United States for the fiscal year ending June 30, 1915, amounted to $2,889,029,457, or $166,404,055 less than in 1914, according to the compilation of the Bureau of Railway Economics, giving the complete figures for the revenues and expenses of Class I roads, those having annual revenues of over $1,000,000. By drastic economies the operating expenses were reduced to $2,032,689,894, a decrease of $186,244,099. Net operating revenue as a result shows an increase of $22,840,044, to $856,339,581. Total operating revenues averaged $12,641 per mile, a reduction of 6.3 per cent; operating expenses averaged $8,894 per mile, a decrease of 9.3 per cent, and net operating revenues averaged $3,747 per mile, an increase of 1.8 per cent. Taxes amounted to $133,993,519, a decrease of $2,765,192, or 3 per cent per mile, while operating income was $721,705,717, an increase of $24,991,787, or 2.6 per mile. These figures cover 228,554 miles of line.

It should be noted that the decrease in total revenues in 1915 comes after a decrease of $65,691,076 in 1914, as compared with 1913, and that the slight gain in operating income is obtained by comparison with a year in which there was a decrease in this item of $118,657,668. And as nearly half of the reduction in expenses represents decreases in the maintenance accounts it is apparent that the small improvement in net for the year was gained only by deferring many needed expenditures on roadway and equipment to some future date.

The increases in net operating revenue are entirely attributable to the more favorable showing of the Eastern roads in 1915 than in 1914. The Western and Southern group of lines show decreases both in total operating revenue and in net in spite of reductions in operating expenses. The relatively more favorable showing of the gross and net earnings of the Eastern roads was partly due to the fact that the advances in freight rates allowed by the Interstate Commerce Commission in the 5 per cent case were in effect a part of the year.

Reduced to a per-mile basis, the operating revenues of the Eastern group of railways decreased 4.9 per cent; operating expenses decreased 10 per cent; net operating revenue increased 11.5 per cent; taxes decreased 1.9 per cent; operating income increased 14.4 per cent. On a similar per-mile basis, the operating revenues of the Southern railways decreased 10.4 per cent; operating expenses decreased 10 per cent; net operating revenue decreased 11.3 per cent; taxes decreased 3.6 per cent; operating income decreased 12 per cent. Again, on a per-mile basis, the Western railways shows a decrease in operating revenues of 5.6 per cent; a decrease in operating revenue of 1.6 per cent; a decrease in taxes of 3.7 per cent; a decrease in operating income of 1.3 per cent.

Net operating income for June increased $54 per mile, or 21.2 per cent, as compared with June, 1914. This increase was almost entirely due to reductions in expenses, which have been effected in all parts of the country. In June, 1914, net operating income per mile was 9.8 per cent less than in June, 1913.

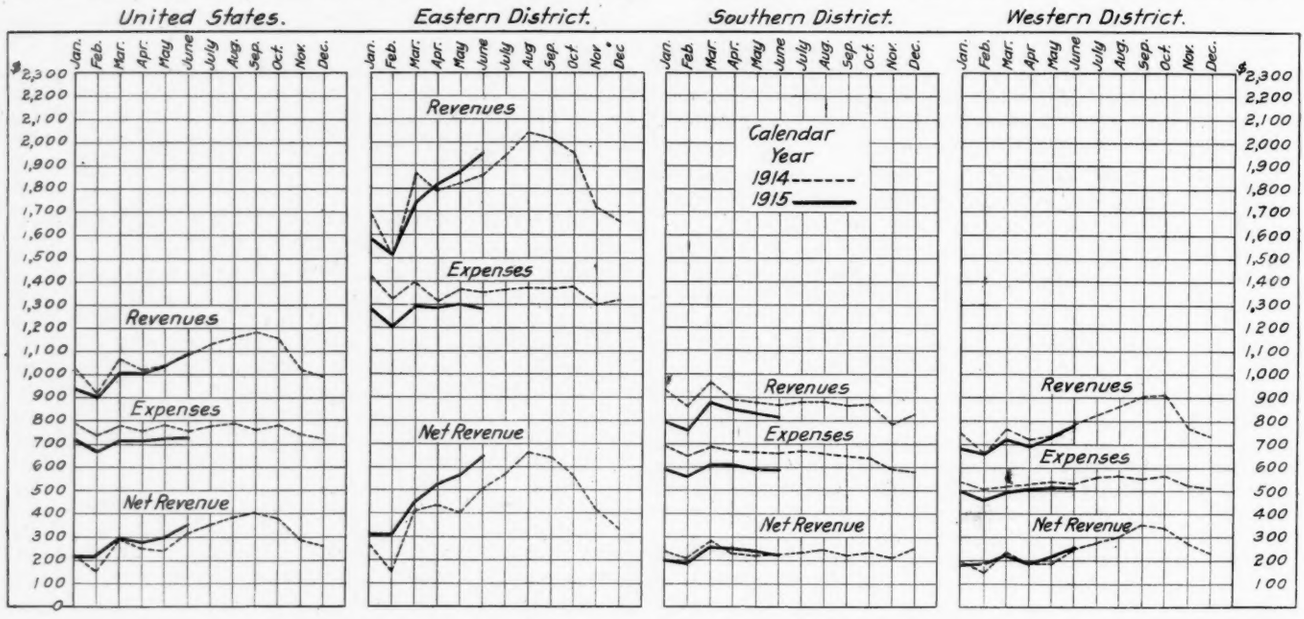
Total operating revenues amounted to $249,489,452, an increase from 1914 of $366,431. Operating expenses were $167,147,556, a decrease of $12,080,015. Net operating revenue amounted to $82,341,896, an increase of $12,446,446. Taxes amounted to $11,345,126, a decrease of $516,782. This left $70,860,953 for net operating income.

Operating revenues per mile of line averaged $1,090 in June, a decrease of 0.6 per cent. Since aggregate revenues increased slightly, this decrease per mile is due to an increase in mileage of 1,700 miles. Operating expenses per mile averaged $730, a decrease of 7.4 per cent; net operating revenue per mile averaged $360, an increase of 16.9 per cent; taxes per mile were $49, a decrease of 5.1 per cent. Net operating income was $310, an increase of 21.2 per cent. Railways operating 228,827 miles are covered by this summary, or about 90 per cent of the steam railway mileage in the United States.

Operating revenues of the Eastern railways per mile increased 3.3 per cent, as compared with June, 1914, operating expenses decreased 7.4 per cent, net operating revenue increased 33.4 per cent, taxes increased 2.1 per cent, and operating income increased 39.2 per cent.

Operating revenues of the Southern railways per mile show a decrease of 5.9 per cent, operating expenses decreased 9.4 per cent, net operating revenue increased 5.0 per cent, taxes decreased 7.2 per cent, and operating income increased 7.4 per cent.

Operating revenues of the Western railways per mile decreased 2.7 per cent, operating expenses decreased 6.3 per cent, net operating revenue increased 5.3 per cent, taxes decreased 10.3 per cent, and operating income increased 8.4 per cent.


United States.
Eastern District.
Southern District.
Western District.
Jan. Feb. Mar. Apr. May June July Aug. Sep. Oct. Nov. Dec.
$2,300 2,200 2,100 2,000 1,900 1,800 1,700 1,600 1,500 1,400 1,300 1,200 1,100 1,000 900 800 700 600 500 400 300 200 100
Revenues
Expenses
Net Revenue
Calendar Year
1914------
1915——

Monthly Revenues and Expenses per Mile of Line in 1914 and 1915

Yale Engineering Association

The Yale Engineering Association, now being organized along the lines of similar associations conducted by the engineering graduates of other universities, will hold its first meeting in New Haven early in November. This association has as its primary objects: to help the educational work at Yale; to establish cordial and mutually helpful relations between Yale engineers, and, in general, to come into association with similar college engineering organizations for the promotion of good fellowship and engineering knowledge, to encourage Yale men to join the national technical societies, etc. The organization will appeal most strongly to those engaged in engineering, transportation and manufacturing, but any Yale graduate will be eligible for membership. The officers are: president, Edwin M. Herr, president of the Westinghouse Electric & Manufacturing Company; vice-president, Harry N. Covell, works manager of the Lidgerwood Manufacturing Company, Brooklyn, N. Y., and secretary-treasurer, Richard T. Dana, consulting engineer.

OPERATING RETURNS OF RAILWAYS FOR THE FISCAL YEARS ENDING JUNE 30, 1914 AND 1915

(Compiled by the Bureau of Railway Economics from returns to the Interstate Commerce Commission of railways having annual operating revenues above $1,000,000)

Road	Average miles operated 1915	Operating Revenues 1915	Operating Revenues 1914	Per Cent of increase	Operating Expenses 1915	Operating Expenses 1914	Per Cent of increase	Net Operating Revenue 1915	Net Operating Revenue 1914	Per Cent of increase	Taxes 1915	Taxes 1914	Per Cent of increase	Operating Income 1915	Operating Income 1914	Per Cent of increase
EASTERN DISTRICT:																
Ann Arbor	294.60	$2,310,902	$2,294,466	0.7	$1,645,879	$1,653,418	d0.5	$665,023	$641,048	3.7	$143,460	$164,050	d12.6	$520,994	$476,998	9.2
Atlantic & St. Lawrence	166.72	1,557,152	1,657,507	d6.1	1,279,475	1,411,263	d9.3	277,677	246,244	12.8	138,019	129,736	6.4	139,658	116,509	19.9
Atlantic City	170.22	2,357,275	2,408,013	d2.1	1,969,276	1,999,006	d1.5	387,999	409,007	d5.1	186,500	149,000	13.1	219,139	260,007	d15.7
Baltimore & Ohio	4,535.27	91,815,797	99,085,051	d7.3	63,925,508	74,352,216	d14.0	27,890,289	24,732,835	12.8	3,289,611	3,226,466	2.0	24,581,697	21,506,370	14.3
Baltimore & Ohio Chicago Terminal	79.50	1,555,299	1,640,978	d5.2	1,084,538	1,307,813	d17.1	470,761	333,165	41.3	222,783	220,965	0.8	247,509	112,200	120.6
Bangor & Aroostook	631.56	3,763,398	3,809,619	d1.2	2,361,050	2,427,413	d2.7	1,402,348	1,382,206	1.5	129,917	112,606	15.4	1,271,418	1,269,600	0.1
Belt Ry. Co. of Chicago	24.37	3,168,166	3,057,267	3.6	1,704,062	1,877,279	d9.2	1,464,104	1,179,988	24.1	140,587	121,534	15.7	1,323,516	1,058,454	25.1
Bessemer & Lake Erie	204.49	8,665,548	8,518,878	1.7	4,759,122	5,833,578	d18.4	3,906,426	2,685,300	45.5	215,585	336,000	d35.8	3,690,770	2,349,300	57.1
Boston & Maine	2,301.90	46,673,049	48,160,286	d3.1	35,909,772	38,856,219	d7.6	10,763,277	9,304,067	15.7	1,978,223	2,059,017	d3.9	8,779,110	7,245,050	21.2
Buffalo & Susquehanna R. R. Corporation	252.56	1,444,898	1,602,073	d9.8	1,247,489	1,386,588	d10.0	197,409	215,485	d8.4	31,200	19,714	58.3	166,209	195,772	d15.1
Buffalo, Rochester & Pittsburg	586.48	9,479,936	10 734,691	d11.7	6,935,252	7,965,117	d12.9	2,544,684	2,769,574	d8.1	230,000	234,000	d1.7	2,314,087	2,535,574	d8.7
Canadian Pacific (Lines in Maine)	233.30	1,297,609	1,389,305	d6.6	1,093,901	1,384,587	d21.0	203,708	4,718	4,217.7	134,936	139,450	d3.2	68,772	d134,732	151.0
Central New England	303.73	4,055,046	3,764,260	7.7	2,572,654	2,518,893	2.1	1,482,392	1,245,367	19.0	139,240	126,804	9.8	1,343,116	1,118,443	20.1
Central R. R. Co. of New Jersey	680.65	28,742,256	29,251,092	d1.7	18,951,307	19,741,844	d4.0	9,790,949	9,509,248	3.0	1,433,783	1,339,454	7.0	8,357,126	8,169,794	2.3
Central Vermont	411.02	3,899,659	4,178,957	d6.7	3,047,311	3,688,529	d17.4	852,348	490,428	73.8	186 270	192,475	d3.2	665,333	297,953	123.3
Chicago & Eastern Illinois	1,282.41	14,210,602	15,633,625	d9.1	11,605,905	13,086,489	d11.3	2,604,697	2,547,136	2.3	636,000	630,500	0.9	1,967,224	1,916,636	2.6
Chicago & Erie	269.56	6,050,494	5,512,663	9.8	4,492,837	5,844,915	d23.1	1,557,657	d332,252	568.8	202,993	176,300	15.1	1,354,617	d508,552	366.4
Chicago, Detroit & Canada Grand Trunk Jct.	60.00	969,098	1,016,607	d4.7	795,227	879,947	d9.6	173,871	136,660	27.2	35,208	34,466	2.2	138,644	102,193	35.7
Chicago, Indianapolis & Louisville	622.41	6,559,665	6,944,005	d5.5	4,678,021	5,184,728	d9.8	1,881,644	1,759,277	7.0	320,771	332,990	d4.4	1,560,359	1,426,287	9.6
Chicago, Terre Haute & Southeastern	372.71	2,186,268	2,170,289	0.7	1,612,431	1,787,306	d9.8	573,837	382,983	49.8	134,641	138,000	d2.4	438,946	244,983	79.2
Cincinnati, Hamilton & Dayton	1,011.08	9,725,972	10,084,217	d3.6	8,571,712	9,737,841	d12.0	1,154,260	346,376	233.2	430,141	464,609	d7.4	721,710	d118,233	710.4
Cincinnati Northern	245.72	1,541,351	1,459,278	5.6	1,159,737	1,437,541	d19.3	381,614	21,737	1,655.6	64,463	70,059	d8.0	316,594	d48,322	755.2
Cleveland, Cincinnati, Chicago & St. Louis	2,372.74	35,824,106	36,405,577	d1.6	27,018,315	32,266,516	d16.3	8,805,790	4,139,061	112.7	1,549,027	1,469,369	5.4	7,242,192	2,669,692	171.3
Cumberland Valley	163.65	2,898,794	3,525,462	d17.8	2,021,579	2,413,495	d16.2	877,215	1,111,967	d21.1	68,836	72,636	d5.2	808,379	1,039,331	d22.2
Delaware & Hudson	880.55	22,701,942	23,228,133	d2.3	14,702,656	15,462,187	d4.9	7,999,286	7,765,946	3.0	659,294	660,607	d0.2	7,339,504	7,105,339	3.3
Delaware, Lackawanna & Western	958.64	43,044,705	43,393,307	d0.8	27,411,441	28,777,323	d4.7	15,633,265	14,615,984	7.0	2,105,399	2,100,000	0.3	13,526,152	12,515,585	8.1
Detroit & Mackinac	400.22	1,077.317	1,210,333	d11.0	793,735	852,880	d6.9	283,582	357,453	d20.7	82,491	105,904	d22.1	201,091	251,549	d20.1
Detroit & Toledo Shore Line	78.95	1,471,160	1,544,330	d4.7	742,338	768,136	d3.4	728,822	776,194	d6.1	67,227	66,976	0.4	661,595	709,218	d6.7
Detroit, Grand Haven & Milwaukee	190.52	2,655,553	2,570,246	3.3	2,244,076	2,282,396	d1.7	411,477	287,850	42.9	45,254	40,272	12.4	363,741	247,578	46.9
Detroit, Toledo & Ironton	441.29	1,767,580	1,513,953	16.8	1,631,443	2,290,315	d28.8	136,136	d776,362	117.5	58,200	74,854	d22.2	77,918	d851,216	109.2
Elgin, Joliet & Eastern	776.74	8,541,355	11,252,392	d24.1	5,298,604	7,755,239	d31.7	3,242,751	3,497,153	d7.3	434,700	426,863	1.8	2,807,787	3,070,291	d8.5
Erie	1,987.84	54,780,254	55,479,812	d1.3	41,352,461	40,495,859	2.1	13,427,793	14,983,953	d10.4	1,593,712	1,689,427	d5.7	11,807,039	13,294,526	d11.2
Grand Rapids & Indiana	575.03	5,315,747	5,552,842	d4.3	4,070,192	4,446,439	d8.5	1,245,556	1,106,403	12.6	274,624	289,245	d5.1	968,444	817,158	18.5
Grand Trunk Western	347.05	7,238,465	7,272,440	d0.5	6,054,365	6,150,735	d1.6	1,184,100	1,121,705	5.6	394,027	431,032	d8.6	789,188	690,674	14.3
Hocking Valley	351.70	6,181,153	7,021,145	d12.0	4,184,370	4,803,747	d12.9	1,996,783	2,217,398	d9.9	418,522	451,136	d7.2	1,577,216	1,766,262	d10.7
Indiana Harbor Belt	109.54	3,276,224	3,284,687	d0.3	2,262,446	2,504,207	d9.7	1,013,778	780,480	29.9	92,627	75,541	22.6	920,433	704,938	30.6
Lake Erie & Western	900.01	5,683,649	5,743,649	d1.0	4,409,746	4,728,228	d6.7	1,273,903	1,015,421	25.5	280,541	267,640	4.8	992,207	747,781	32.7
Lehigh & Hudson River	96.60	1,816,585	1,774,792	2.4	1,194,386	1,293,131	d7.6	622,199	481,661	29.2	50,645	49,768	1.8	571,555	431,893	32.3
Lehigh & New England	294.37	2,646,662	2,255,800	17.3	1,479,802	1,257,280	17.7	1,166,860	998,520	16.9	67,839	43,126	57.3	1,098,737	955,394	15.0
Lehigh Valley	1,443.52	42,525,962	42,170,647	0.8	29,947,388	30,087,905	d0.5	12,578,574	12,082,742	4.1	1,689,109	1,659,281	1.8	10,874,683	10,423,461	4.3
Long Island	397.62	13,318,081	12,889,368	3.3	9,075,764	9,304,948	d2.5	4,242,317	3,584,420	18.4	863,055	774,733	11.4	3,376,281	2,809,687	20.2
Maine Central	1,215.94	11,350,423	11,833,989	d4.1	8,143,965	8,685,607	d6.2	3,206,458	3,148,382	1.8	644,785	611,496	5.4	2,561,482	2,536,886	1.0
Michigan Central	1,800.04	33,760,735	34,931,060	d3.4	24,876,172	27,566,105	d9.8	8,884,563	7,364,955	20.6	1,529,350	1,494,814	2.3	7,350,275	5,870,141	25.2
Monongahela	72.22	1,125,100	1,426,965	d21.2	619,938	594,313	4.3	505,162	832,652	d39.3	20,481	27,200	d24.7	484,681	805,452	d39.8
New York Central	5,942.26	170,417.813	177,321,206	d3.9	119,663,964	137,370,961	d12.9	50,753,849	39,950,245	27.0	9,223,762	8,822,148	4.6	41,516,957	31,128,097	33.4
New York, Chicago & St. Louis	567.89	11,413,775	11,809,368	d3.3	9,063,046	9,761,702	d7.2	2,350,729	2,047,666	14.8	453,767	487,602	d6.9	1,895,989	1,560,064	21.5
New York, New Haven & Hartford	2,003.17	65,379,264	67,452,592	d3.1	44,126,624	49,233,010	d10.4	21,252,640	18,219,582	16.6	1,743,921	3,563,355	d23.0	18,500,888	14,656,227	26.2
New York, Ontario & Western	568.46	8,926,946	9,251,570	d3.5	6,542,996	6,910,648	d5.3	2,383,950	2,340,922	1.8	242,455	238,562	1.6	2,141,440	2,102,360	1.9
New York, Philadelphia & Norfolk	112.00	3,816,460	3,812,826	0.1	3,022,725	3,100,747	d2.5	793 734	712,079	11.5	111,477	105,550	5.6	682,026	606,529	12.4
New York, Susquehanna & Western	140.14	3,159,505	3,205,081	d1.4	2,124,839	2,278,538	d6.7	1,034,666	926,543	11.7	84,104	149,331	d43.7	938,945	777,212	20.8
Pennsylvania Co.	1,757.47	53,652,932	61,598,332	d12.9	40,012,274	46,634,757	d14.2	13,640,659	14,963,575	d8.8	3,127,319	3,284,866	d4.8	10,510,141	11,678,708	d10.0
Pennsylvania R. R. Co.	4,527.81	183,671,208	198,081,800	d7.3	139,560,911	153,508,766	d9.1	44,110,297	44,573,034	d1.0	7,710,954	7,844,238	d1.7	36,375,649	36,728,797	d1.0
Pere Marquette	2,313.62	18,028,210	16,915,198	6.6	13,444,014	18,034,174	d25.5	4,584,196	d1,118,976	509.7	512,844	643,168	d20.3	4,069,504	d1,762,145	330.9
Philadelphia & Reading	1,119.75	46,714,821	49,293,103	d5.2	31,125,387	33,368,924	d6.7	15,589,434	15,924,179	d2.1	1,166,688	1,267,503	d8.0	14,416,848	14,656,676	d1.6
Philadelphia, Baltimore & Washington	717.07	20,255,253	20,656,989	d1.9	16,418,995	17,109,807	d4.0	3,836,258	3,547,182	8.1	673,735	656,326	2.7	3,161,192	2,890,856	9.4
Pittsburg & Lake Erie	224.91	14,639,732	17,669,362	d17.1	9,229,102	10,950,276	d15.7	5,410,630	6,719,086	d19.5	607,596	689,886	d11.9	4,802 908	6,029,201	d20.3
Pittsburg, Cincinnati, Chicago & St. Louis	1 478.75	38,412,030	42,117,598	d8.8	29,136,470	33,231,597	d12.3	9,275,560	8,886,001	4.4	1,936,949	1,906,195	1.6	7,334,262	6,979,807	5.1
Pittsburg, Shawmut & Northern	294.06	1,834,056	2,099,974	d12.7	1,448,919	1,779,947	d18.6	385,137	320,027	20.3	19,767	19,404	1.9	365,371	300,623	21.5
Port Reading	21.16	1,517,847	1,571,296	d3.4	742,766	849,607	d12.6	775,081	721,689	7.4	132,000	174,000	d24.1	643,081	547,689	17.4
Rutland	468.11	3,479,389	3,727,903	d6.7	2,547,051	2,838,256	d10.3	932,338	889,648	4.8	204,466	206,598	d1.0	727,746	683,049	6.5
Toledo & Ohio Central	444.74	4,946,740	5,131,935	d7.6	3,826,318	4,589,736	d16.6	1,120,421	762,199	47.0	267,957	256,715	4.4	850,470	505,484	68.2
Toledo, St. Louis & Western	450.58	4,636,059	4,588,121	1.0	3,496,954	3,138,146	11.4	1,139,105	1,449,975	d21.4	250,182	204,836	22.1	888,922	1,245,138	d28.6
Ulster & Delaware	128.88	1,033,734	1,076,217	d3.9	918,038	835,487	9.9	115,696	240,730	d51.9	42,394	40,129	5.6	72,601	200,601	d63.8
Union R. R. Co. of Baltimore	9.49	1,588,307	1,633,774	d2.8	251,293	271,309	d7.4	1,337,014	1,362,465	d1.9	69,124	72,162	d4.2	1,267,890	1,290,304	d1.7
Union R. R. Co. (of Pennsylvania)	30.57	3,645,074	4,169,777	d12.6	3,178,705	3,855,875	d17.6	466,369	313,901	48.6	45,975	98,700	d53.4	420,394	215,201	95.3

a Returns for 1914 and 1915 are not fully comparable. d Decrease or deficit. dd Decrease deficit. id Increase deficit. * Less than one-tenth of one per cent.

OPERATING RETURNS OF RAILWAYS FOR THE FISCAL YEAR ENDING JUNE 30, 1914 AND 1915. (Continued)

(Compiled by the Bureau of Railway Economics from returns to the Interstate Commerce Commission of railways having annual operating revenues above $1,000,000)

Road	Average miles operated 1915	Operating Revenues			Operating Expenses			Net Operating Revenue			Taxes			Operating Income		
		1915	1914	Per Cent of increase	1915	1914	Per Cent of increase	1915	1914	Per Cent of increase	1915	1914	Per Cent of increase	1915	1914	Per cent of increase
EASTERN DISTRICT—*Continued:*																
Vandalia	910.05	$10,972,885	$11,255,235	d2.5	$8,686,453	$8,842,199	d1.8	$2,286,433	$2,413,036	d5.2	$394,263	$381,865	3.2	$1,891,550	$2,031,172	d6.9
Wabash	2,518.54	29,082,788	30,214,858	d3.7	23,178,837	24,651,975	d6.0	5,903,951	5,562,883	6.1	968,877	1,044,310	d7.2	4,931,005	4,518,573	9.1
Western Maryland	661.23	8,683,459	8,277,092	4.9	6,257,412	7,859,740	d20.4	2,426,047	417,352	481.3	306,000	263,205	16.3	2,119,188	154,147	1,274.8
West Jersey & Seashore	356.47	6,534,491	6,569,778	d0.5	5,280,256	5,309,524	d0.6	1,254,235	1,260,254	d0.5	343,627	316,850	8.5	910,264	943,404	d3.5
Wheeling & Lake Erie	512.13	5,428,069	7,658,424	d29.1	4,039,740	5,296,660	d23.7	1,388,329	2,361,764	d41.2	385,907	396,831	d2.8	1,002,407	1,964,933	d49.0
SOUTHERN DISTRICT:																
Alabama & Vicksburg	142.78	1,493,067	1,869,650	d20.1	1,314,147	1,524,156	d13.8	178,920	345,494	d48.2	95,241	97,798	d2.6	82,153	247,697	d66.8
Alabama Great Southern	309.41	4,776,630	5,426,175	d12.0	3,653,734	4,269,411	d14.4	1,122,986	1,156,764	d2.9	177,930	189,857	d6.3	944,263	966,908	d2.3
Atlanta & West Point	92.99	1,185,338	1,305,524	d9.2	934,379	990,725	d5.7	250,959	314,799	d20.3	75,078	82,911	d9.4	175,454	231,888	d24.3
Atlanta, Birmingham & Atlantic	642.17	2,656,483	3,399,361	d21.9	2,374,111	2,766,954	d14.2	282,372	632,407	d55.3	146,682	172,042	d14.7	133,807	460,365	d70.9
Atlantic Coast Line	4,689.61	31,536,475	36,905,677	d14.5	22,904,157	26,294,507	d12.9	8,632,318	10,611,170	d18.6	1,589,157	1,561,159	1.8	7,038,197	9,050,011	d22.2
Birmingham Southern	42.93	796,498	1,161,830	d31.4	647,521	835,856	d22.5	148,977	325,974	d54.3	29,191	25,223	15.7	119,786	300,752	d60.2
Carolina, Clinchfield & Ohio	248.23	2,131,162	2,520,306	d15.4	1,121,669	1,185,828	d5.4	1,009,493	1,334,478	d24.4	157,248	124,892	25.9	851,936	1,209,586	d29.6
Central of Georgia	1,924.09	12,108,184	14,326,575	d15.5	8,973,512	10,785,764	d16.8	3,134,672	3,540,811	d11.5	576,544	631,597	d8.7	2,547,633	2,909,214	d12.4
Charleston & Western Carolina	340.64	1,765,636	2,095,812	d15.8	1,361,344	1,600,467	d14.9	404,292	495,345	d18.4	64,484	66,651	d3.3	339,750	428,694	d20.7
Chesapeake & Ohio	2,369.20	39,464,037	37,459,864	5.4	27,556,414	26,413,899	4.3	11,907,623	11,045,965	7.8	1,349,497	1,330,935	1.4	10,549,914	9,715,030	8.6
Cincinnati, New Orleans & Texas Pacific	337.27	9,422,252	10,962,100	d14.0	6,807,448	7,811,110	d12.8	2,614,804	3,150,990	d17.0	372,109	368,000	1.1	2,241,689	2,782,990	d19.5
Florida East Coast	719.93	5,513,478	5,397,646	2.1	3,418,531	3,716,214	d8.0	2,094,947	1,681,432	24.6	236,090	239,717	d1.5	1,857,999	1,441,715	28.9
Georgia R. R. Lessee Organization	307.00	2,791,590	3,327,444	d16.1	2,332,399	2,632,073	d11.4	459,191	695,371	d34.0	54,749	37,261	46.9	403,083	658,110	d38.8
Georgia Southern & Florida	395.00	2,215,773	2,598,760	d14.7	1,843,662	2,115,522	d12.9	372,111	483,238	d23.0	116,180	136,220	d14.7	253,405	347,018	d27.0
Gulf & Ship Island	307.36	1,633,006	1,996,934	d18.2	1,110,352	1,375,146	d19.3	522,654	621,788	d15.9	92,057	90,657	1.5	430,234	531,098	d19.0
Illinois Central	4,770.03	62,111,552	66,373,503	d6.4	47,975,197	51,292,781	d6.5	14,136,355	15,080,722	d6.3	3,233,838	3,341,247	d3.2	10,878,473	11,739,475	d7.3
Kanawha & Michigan	176.60	2,911,415	3,110,672	d6.4	2,064,072	2,220,481	d7.0	847,343	890,191	d4.8	137,781	124,806	10.4	709,527	765,384	d7.3
Louisville & Nashville	5,030.67	51,606,015	59,906,467	d13.9	39,431,789	45,012,305	d12.4	12,174,226	14,894,162	d18.3	2,145,109	2,600,288	d17.5	10,023,052	12,288,155	d18.4
Louisville, Henderson & St. Louis	199.80	1,397,190	1,381,823	1.1	1,088,151	1,025,008	6.2	309,039	356,815	d13.4	38,425	45,463	d15.5	270,460	311,352	d13.1
Mobile & Ohio	1,122.48	10,982,149	13,002,583	d15.5	7,933,656	10,122,145	d21.6	3,048,493	2,880,438	5.8	385,591	416,519	d7.4	2,660,762	2,463,919	8.0
Nashville, Chattanooga & St. Louis	1,230.52	10,936,533	12,884,359	d15.1	9,099,622	10,195,523	d10.7	1,836,911	2,688,836	d31.7	318,333	326,557	d2.5	1,516,614	2,362,279	d35.8
New Orleans & Northeastern	203.73	3,486,255	4,057,275	d14.1	2,642,493	3,143,438	d15.9	843,762	913,837	d7.7	176,872	182,586	d3.1	666,151	731,250	d8.9
New Orleans Great Northern	282.77	1,599,999	1,874,986	d14.7	1,051,138	1,132,862	d7.2	548,861	742,124	d26.0	35,549	33,583	5.9	512,992	708,541	d27.6
New Orleans, Mobile & Chicago	402.90	1,771,473	2,205,704	d19.7	1,320,686	1,453,399	d9.1	450,787	752,305	d40.1	75,838	85,726	d11.5	374,129	666,578	d43.9
Norfolk & Western	2,041.95	42,987,044	44,650,310	d3.7	27,831,815	30,135,407	d7.6	15,155,229	14,514,903	4.4	1,878,000	1,620,000	15.9	13,276,418	12,894,903	3.0
Norfolk Southern	900.04	3,875,875	4,266,846	d9.2	2,973,878	3,183,991	d6.6	901,997	1,082,855	d16.7	130,943	136,399	d4.0	769,671	946,456	d18.7
Richmond, Fredericksburg & Potomac	87.68	2,907,830	2,978,393	d2.4	1,852,764	1,912,235	d3.1	1,055,066	1,066,158	d1.0	87,847	91,430	d3.9	967,014	974,728	d0.8
Seaboard Air Line	3,105.59	21,280,463	25,420,503	d16.3	14,922,534	17,463,706	d14.6	6,357,929	7,956,797	d20.1	1,062,247	999,000	6.3	5,286,779	6,957,797	d24.0
Southern	7,031.42	62,199,510	70,750,997	d12.1	46,174,711	51,760,649	d10.8	16,024,799	18,990,348	d15.6	2,595,828	2,679,390	d3.1	13,400,055	16,310,958	d17.8
Southern Ry. Co. in Mississippi	280.61	992,913	1,289,586	d23.0	900,666	1,040,554	d13.4	92,247	249,032	d63.0	101,874	190,864	1.0	d10,146	148,168	d106.8
Tennessee Central	293.71	1,481,404	1,707,339	d13.2	1,259,451	1,299,249	d3.1	221,953	408,090	d45.6	56,061	53,763	4.3	165,720	354,327	d53.2
Virginia & Southwestern	240.14	1,799,301	1,939,104	d7.2	1,338,706	1,370,867	d2.3	460,595	568,237	d18.9	80,815	77,410	4.4	379,769	490,827	d22.6
Virginian	503.59	5,820,406	6,556,499	d11.2	3,376,851	3,666,769	d7.9	2,443,555	2,889,730	d15.4	253,336	257,195	d1.5	2,189,974	2,632,535	d16.8
Washington Southern	35.57	1,263,358	1,297,852	d2.7	905,804	928,408	d2.4	357,554	369,444	d3.2	40,659	43,962	d7.5	316,731	325,482	d2.7
Western Ry. of Alabama	133.07	1,252,293	1,511,085	d17.7	1,054,450	1,156,811	d8.8	197,843	354,274	d44.2	63,854	59,673	7.0	133,374	294,601	d54.7
Yazoo & Mississippi Valley	1,378.41	11,836,984	12,552,596	d5.7	8,343,201	8,707,323	d4.2	3,493,783	3,845,273	d9.1	593,150	583,772	1.6	2,898,369	3,261,502	d11.1
WESTERN DISTRICT:																
Arizona Eastern	366.75	2,200,786	2,812,378	d21.7	1,377,672	1,658,281	d16.9	823,114	1,154,097	d28.7	151,111	160,658	d5.9	671,370	993,440	d32.4
Atchison, Topeka & Santa Fe	8,492.15	97,082,746	93,540,268	3.8	61,384,299	60,172,701	2.0	35,698,447	33,367,567	7.0	4,748,259	4,773,441	d0.5	30,930,100	28,594,126	8.2
Bingham & Garfield	26.87	1,346,009	1,775,538	d24.2	561,113	672,685	d16.6	784,896	1,102,853	d28.8	33,415	35,456	d5.8	751,481	1,067,397	d29.6
Chicago & Alton	1,033.48	14,245,624	14,259,479	d0.1	11,072,707	12,307,744	d10.0	3,172,917	1,951,735	62.6	508,839	568,938	d10.6	2,660,584	1,382,797	92.4
Chicago & North Western	8,107.82	80,779,675	84,559,335	d4.5	56,371,573	60,301,575	d6.5	24,408,102	24,257,759	0.6	4,516,943	4,252,790	6.2	19,883,905	20,004,969	d0.6
Chicago, Burlington & Quincy	9,339.33	91,125,061	93,687,141	d2.7	60,441,367	63,224,853	d4.4	30,683,694	30,462,288	0.7	4,081,849	4,016,658	1.6	26,577,688	26,445,631	0.5
Chicago Great Western	1,427.91	13,920,685	14,349,739	d3.0	10,446,567	10,923,634	d4.4	3,474,118	3,426,105	1.4	580,027	498,764	16.3	2,889,931	2,927,341	d1.3
Chicago Junction	23.94	1,976,561	2,029,764	d2.6	1,652,207	1,545,013	6.9	324,354	484,751	d33.1	23,899	28,443	d15.9	299,810	456,318	d34.3
Chicago, Milwaukee & St. Paul	10,045.50	91,435,374	93,613,700	d2.3	61,971,701	62,890,301	d1.5	29,463,673	30,723,399	d4.1	4,746,721	4,106,557	15.6	24,685,113	26,616,841	d7.3
Chicago, Peoria & St. Louis	255.47	1,597,908	1,663,809	d4.0	1,412,314	1,686,470	d16.3	185,594	d22,670	918.7	65,862	72,265	d8.9	119,732	d94,935	226.1
Chicago, Rock Island & Gulf	476.75	2,900,445	2,838,853	2.2	2,188,174	2,135,300	2.5	712,271	703,553	1.2	93,569	115,055	d18.7	618,038	588,498	5.0
Chicago, Rock Island & Pacific	7,854.56	68,036,217	65,836,989	3.8	51,339,255	49,500,521	3.7	16,696,962	16,336,469	2.2	3,249,857	3,200,577	1.5	13,415,308	13,115,254	2.3
Chicago, St. Paul, Minneapolis & Omaha	1,752.81	17,841,348	18,210,083	d2.0	12,107,598	12,834,117	d5.7	5,733,750	5,375,966	6.7	1,015,029	973,293	4.3	4,713,887	4,402,684	7.1

a Returns for 1914 and 1915 are not fully comparable. d Decrease or deficit. dd Decrease deficit. id Increase deficit. * Less than one-tenth of one per cent.

OPERATING RETURNS OF RAILWAYS FOR THE FISCAL YEARS ENDING JUNE 30, 1914 AND 1915. (Continued)

(Compiled by the Bureau of Railway Economics from returns to the Interstate Commerce Commission of railways having annual operating revenues above $1,000,000)

Road	Average miles operated 1915	Operating Revenues			Operating Expenses			Net Operating Revenue			Taxes			Operating Income		
		1915	1914	Per Cent of increase	1915	1914	Per Cent of increase	1915	1914	Per Cent of increase	1915	1914	Per Cent of increase	1915	1914	Per cent of increase
WESTERN DISTRICT (Continued):																
Colorado & Southern	1,100.66	$7,662,277	$7,674,557	d0.2	$5,557,784	$5,658,715	d1.8	$2,104,493	$2,015,842	4.4	$423,150	$397,543	6.4	$1,680,932	$1,618,299	3.9
Colorado Midland	377.64	1,698 780	1,773,413	d4.2	1,541,176	1 754,952	d12.2	157,604	18,461	753.7	109,709	108,000	1.6	47,895	d89,539	153.5
Cripple Creek & Colorado Springs R. R.	86.65	1,235,728	1,228,512	0.6	691,512	703,304	d1.7	544,216	525,208	3.6	66,824	75,865	d11.9	477,392	449,343	6.2
Denver & Rio Grande	2,571.46	21,823,236	23,593,641	d7.5	14,289,671	16,460,569	d13.2	7,533,565	7,133,072	5.6	1,020,606	1,009,144	1.1	6,511,607	6,123,564	6.3
Denver & Salt Lake	255.46	1,645,085	1,215,361	35.4	1,115,107	916,812	21.6	529,978	298,549	77.5	76.776	36,587	109.8	453,202	261,962	73.0
Duluth & Iron Range	282.01	4,824,605	6,599,279	d26.9	2,761,606	3,545,736	d22.1	2,062,999	3,053,543	d32.4	248,658	350,917	d29.1	1,814,339	2,702,626	d32.9
Duluth, Missabe & Northern	366.97	6,292,071	7,391,267	d14.9	2,990,202	4,099,862	d27.1	3,301,869	3,291,405	0.3	326,939	406,118	d19.5	2,974,930	2,885,287	3.1
Duluth, South Shore & Atlantic	627.35	2,938,597	3,495,645	d15.9	2,401,835	2,842,411	d15.5	536,762	653,234	d17.8	197,313	247,443	d20.3	339,342	405,791	d16.4
Duluth, Winnipeg & Pacific	185.19	1,285,548	1,743,894	d26.3	971,200	1,378,570	d29.6	314,348	365,324	d14.0	64,166	87,721	d26.9	250,182	277,603	d9.9
El Paso & Southwestern	1,027.39	7,788,736	9,083,060	d14.2	4,729,225	5,653,071	d16.3	3,059,511	3,429,989	d10.8	400,743	487,224	d17.7	2,643,392	2,942,765	d10.2
Fort Worth & Denver City	454.14	5,302,762	4,778,283	11.0	3,831,487	3,580,063	7.0	1,471,275	1,198,220	22.8	144,716	182,072	d20.5	1,326 559	1,016,147	30.5
Galveston, Harrisburg & San Antonio	1,346.51	11,212,140	11,972,399	d6.4	9,251,989	9,901,961	d6.6	1,960,151	2,070,438	d5.3	504,114	573,952	d12.2	1,453,907	1,496,485	d2.8
Great Northern	8,059.56	67,133,303	76,822,434	d12.6	36,798,928	47,741,090	d22.9	30,334,375	29,081,344	4.3	4,627,944	4,790,573	d3.4	25,703,241	24,290,771	5.8
Gulf, Colorado & Santa Fe a	1,937.13	16,250,386	12,882,258	a	11,440,192	9,959,733	a	4,810,194	2,922,525	a	622,115	583,331	a	4,184,521	2,339,194	a
Houston & Texas Central	868.74	6,563,488	6,570,737	d0.1	5,182,224	5,576,679	d7.1	1,381,264	994,058	39.0	326,445	326,310	*	1,053,272	667,748	57.7
Houston East & West Texas	190.94	1,361,858	1,443,373	d5.6	1,051,927	1,061,696	d0.9	309,931	381,677	d18.8	59,767	57,010	4.8	249,796	324,667	d23.1
International & Great Northern	1,159.50	9,083,626	9,963,408	d8.8	7,871,449	8,062,467	d2.4	1,212,177	1,900,940	d36.2	400,000	339,841	17.7	806,500	1,561,099	d48.3
Kansas City, Mexico & Orient R. R.	739.58	2,449,619	1,903,156	28.7	2,199,351	2,138,164	2.9	250,268	d235,007	206.5	110,544	113,216	d2.4	139,704	d348,223	140.1
Kansas City Southern	827.17	10,035,896	10,970,403	d8.5	6,478,821	6,910,321	d6.2	3,557,075	4,060,082	d12.4	574,316	567,857	1.1	2,977,274	3,492,225	d14.7
Louisiana & Arkansas	278.72	1,679,951	1,700,209	d1.2	1,113,721	1,135,865	d1.9	566,230	564,344	0.3	82,400	69,255	19.0	483,574	495,089	d2.3
Louisiana Ry. & Navigation Co	350.58	2,023,698	1,971,718	2.6	1,535,730	1,545,600	d0.6	487,968	426,118	14.5	111,655	80,060	39.5	376,313	346,058	8.7
Louisiana Western	207.74	2,186,500	2,348,788	d6.9	1,536,754	1,707,494	d10.0	649,746	641,294	1.3	124,907	114,732	8.9	524,242	526,562	d0.4
Midland Valley	380.19	1,392,739	1,619,499	d14.0	1,080,823	1,344,870	d19.6	311,916	274,629	13.6	69,833	78,983	d11.6	241,430	195,646	23.4
Minneapolis & St. Louis	1,646.47	10,111,975	9,620,675	5.1	6,903,594	6,893,126	0.2	3,208,381	2,727,549	17.6	432,070	410,361	5.3	2,776,305	2,317,188	19.8
Minneapolis, St. Paul & Sault Ste. Marie	4,102.76	27,763,225	29,306,223	d5.3	17,811,374	19,354,259	d8.0	9,951,851	9,951,964	d*	1,135,439	1,182,367	d4.0	8,816,412	8,769,597	0.5
Missouri & North Arkansas	365.24	1,181,851	1,293,618	d8.6	1,333,045	1,225,154	8.8	d151,194	68,464	d320.8	69,815	72,338	d3.5	d221,619	d3,874	id5620.7
Missouri, Kansas & Texas	3,865.07	32,898,759	31,917,924	3.1	22,967,592	23,226,832	d1.1	9,931,167	8,691,092	id1,440.3	1,327,871	1,499,521	d11.4	8,584,604	7,191,571	19.4
Missouri, Oklahoma & Gulf	334.37	1,174,211	1,177,560	d0.3	1,279,766	1,184,413	8.1	d105,555	d6,853	d440.3	70,945	74,309	d4.5	d177,113	d81,162	id118.2
Missouri Pacific	3,920.56	28,325,676	26,696,014	6.1	21,699,164	21,892,703	d0.9	6,626,512	4,803,311	38.0	1,213,763	1,170,180	3.7	5,390,773	3,633,131	48.4
Morgan's Louisiana & Texas R. R. & S. S. Co.	404.53	4,376,736	4,742,576	d7.7	3,417,456	3,673,063	d7.0	959,280	1,069,513	d10.3	246,011	268,623	d8.4	708,858	800,890	d11.5
Nevada Northern	165.10	1,204,326	1,761,197	d31.6	691,935	925,708	d25.3	512,391	835,489	d38.7	60,265	81,242	d25.8	452,075	754,247	d40.1
New Orleans, Texas & Mexico	285.87	1,475,591	1,581,020	d6.7	1,346,269	1,466,805	d8.2	129,322	114,215	13.2	19,092	18,515	3.1	110,051	95,700	15.0
Northern Pacific	6,460.67	63,171,653	70,449,575	d10.3	37,108,049	43,082,458	d13.9	26,063,604	27,367,118	d4.8	4,470,959	5,033,661	d11.2	21,588,493	22,333,457	d3.3
Northwestern Pacific	400.99	3,568,701	3,745,805	d4.7	2,599,193	2,653,359	d2.0	969,508	1,092,446	d11.3	190,489	182,852	4.2	778,882	909,593	d14.4
Oregon Short Line	2,164.90	19,967,925	22,435,890	d11.0	11,880,519	12,632,306	d6.0	8,087,406	9,803,584	d17.5	1,284,232	1,516,784	d15.3	6,800,172	8,286,800	d17.9
Oregon-Washington R. R. & Navigation Co	2,003.04	15,444,056	17,658,067	d12.5	10,057,449	12,207,758	d17.6	5,386,607	5,450,309	d1.2	1,050,104	1,298,817	d19.1	4,335,163	4,151,491	4.4
Panhandle & Santa Fe a	669.05	4,041 901	1,350,819	a	3,034,077	911 653	a	1,007,824	439,166	a	117,140	45,010	a	889,122	394,155	a
St. Joseph & Grand Island	268.08	1,507,314	1,612,258	d6.5	1,172,925	1,429,441	d17.9	334,389	182,817	82.9	95,263	86,482	10.2	238,792	96,336	147.9
St. Louis & San Francisco	4,746.62	40,901,386	42,458,880	d3.7	27,858,045	31,073,710	d10.3	13,043,341	11,385,170	14.6	1,268,264	1,415,348	d10.4	11,755,204	9,969,821	17.9
St. Louis, Brownsville & Mexico	548.18	2,292,560	2,660,633	d13.8	1,690,068	2,107,944	d19.8	602,492	552,689	9.0	76,492	88,701	d13.9	525,267	463,988	13.2
St. Louis, Iron Mountain & Southern	3,364.65	29,883,629	33,289,717	d10.2	20,860,506	21,494,864	d3.0	9,023,123	11,794,853	d23.5	1,338,666	1,343,253	d0.3	7,662,866	10,451,600	d26.7
St. Louis Merchants' Bridge Terminal	9.26	1,813,408	1,923,428	d5.7	1,317,697	1,610,065	d18.2	495,711	313,363	58.2	83,189	67,871	22.6	412,507	245,493	68.0
St. Louis, San Francisco & Texas	234.91	1,141,030	1,480,211	d22.9	1,124,787	1,321,907	d14.9	16,243	158,304	d89.7	14,935	18,368	d18.7	1,278	139,937	d99.1
St. Louis Southwestern	943.30	6,907,573	8,247,467	d16.2	4,557,848	5,211,574	d12.5	2,349,725	3,035,892	d22.6	403,876	389,625	3.7	44,708	2,646,267	d26.5
St. Louis Southwestern Ry. Co. of Texas	810.50	3,720,288	4,544,438	d18.1	3,803,305	4,622,226	d17.7	d83,017	d77,788	id6.7	177,903	212,261	d16.2	d261,966	d290,050	dd9.7
San Antonio & Aransas Pass	724.06	3,797,055	4,648,197	d18.3	3,620,005	3,984,756	d9.2	177,050	663,441	d73.3	159,979	160,563	d0.4	16,207	502,878	d96.8
San Pedro, Los Angeles & Salt Lake	1,131.84	9,497,896	10,822,568	d12.2	6,178,828	7,446,436	d17.0	3,319,068	3,376,132	d1.7	522,545	532,484	d1.9	2,795,941	2,843,648	d1.7
Southern Pacific	6,514.25	97,099 100	103,041,325	d5.8	61,652,012	65,107,378	d5.3	35,447,088	37,933,947	d6.6	4,635,437	5,325,670	d13.0	30,772,596	32,608,277	d5.6
Spokane International	163.40	754,235	1,020,069	d26.1	508,317	591,933	d14.1	245,918	428,136	d42.6	51,134	42,427	20.5	194,651	385,710	d49.5
Spokane, Portland & Seattle	556.15	4,416,688	4,977,137	d11.3	2,538,128	2,889,477	d12.2	1,878,560	2,087,660	d10.0	640,800	640,800	——	1,235,487	1,446,860	14.6
Terminal R. R. Association of St. Louis	34.57	2,687,884	2,811,929	d4.4	1,392,225	1,873,483	d25.7	1,295,659	938,446	38.1	342,330	323,811	5.7	953,239	614,635	55.1
Texas & New Orleans	469.15	3,910,706	4,361,449	d10.3	3,527,658	3,974,797	d11.2	383,048	386,652	d0.9	205,725	214,132	d3.9	175,296	172,520	1.6
Texas & Pacific	1,901.12	17,944,638	18,813,282	d4.6	13,857,387	14,461,140	d4.2	4,087,251	4,352,142	d6.1	856,136	757,341	13.0	3,225,652	3,594,801	d10.3
Toledo, Peoria & Western	247.70	1,175,252	1,293,609	d9.1	1,135,269	1,236,155	d8.2	39,983	57,454	d30.4	73,200	73,921	d1.0	d33,225	d16,467	id101.8
Trinity & Brazos Valley	327.68	980,592	2,302,679	d57.4	989,107	2,386,502	d58.6	d8,515	d83,823	dd89.8	53,060	66,167	d19.8	d62,134	d149,990	dd58.6
Union Pacific	3,616.36	51,546,314	52,021,375	d0.9	30,198,747	30,570,187	d1.2	21,347,567	21,451,188	d0.5	2,307,138	2,263,265	1.9	19,033,637	19,187,923	d0.8
Vicksburg, Shreveport & Pacific	171.47	1,386,737	1,808,974	d23.3	1,251,599	1,408,519	d11.1	135,138	400,455	d66.3	88,679	83,862	5.7	45,790	316,594	d85.5
Western Pacific	942.90	5,708,126	6,251,137	d8.7	4,419,936	5,174,608	d14.6	1,288,190	1,076,529	19.7	355,033	379,259	d6.4	931,305	697,270	33.6

a Returns for 1914 and 1915 are not fully comparable. d Decrease or deficit. dd Decrease deficit. id Increase deficit. * Less than one-tenth of one per cent.

Proper Handling of Equipment

At the September meeting of the Western Railway Club, E. E. Betts, superintendent of transportation of the Chicago & North Western, presented a paper on "The Promotion of the Proper Handling of Equipment." Believing that there was no more complete information on that subject than was contained in the report of the special committee of the General Superintendents' Association of Chicago, of which he was chairman, he presented that report to the club, in full. This was published in the *Railway Age Gazette* of August 13, 1915, on page 281.

The American Electric Railway Association

The thirty-fourth annual convention of the American Electric Railway Association will be held in San Francisco, Cal., from October 4 to 8. Simultaneously there will also be held the annual conventions of the American Electric Railway Accountants' Association, the American Electric Railway Engineering Association, the American Electric Railway Claims Association, the American Electric Railway Transportation and Traffic Association and the American Electric Railway Manufacturers' Association.

The following is the program of the American Electric Railway Association:

MONDAY, OCTOBER 4

9:30 *a. m. to* 5:00 *p. m.*

Registration.

TUESDAY, OCTOBER 5

Morning session, 9:30 *a. m. to* 12:30 *p. m.*

Address of welcome by Hiram W. Johnson, governor of California.

Annual address of the president; annual report of executive committee; annual report of secretary-treasurer; appointment of committees on: (a) resolutions; (b) nominations, and (c) recommendations contained in the president's address.

Reports of committees on: (a) subjects; (b) education; (c) representing association at the American Good Roads Congress; (d) valuation, and (e) national joint committee on overhead and underground line construction.

Address on "Welfare Work" by Jesse W. Lilienthal, president of the United Railroads of San Francisco. Followed by general discussion.

Reports of committees on: (f) company membership; (g) company section medal; (h) federal relations; (i) Anthony N. Brady medal; and (j) compensation for carrying United States mail.

WEDNESDAY, OCTOBER 6

Morning session, 9:30 *a. m. to* 12:30 *p. m.*

Reports of committees on: (a) electrolysis; (b) ways and means; (c) company sections and individual membership; (d) dues of company section members; (e) changes in constitution and by-laws; (f) relations with state and sectional associations, and (g) public relations.

Address on Evils of Government by Jonathan Bourne, Jr., former United States Senator. Followed by general discussion.

Reports of committees on: (h) operation of motor vehicles; (i) Aera advisory; (j) insurance, and (k) standard for car loading.

THURSDAY, OCTOBER 7

Morning session, 9:30 *a. m. to* 12:30 *p. m.*

Reports of committee on: (a) cost of passenger transportation service.

Address on the "Foundation Principles of the Valuation of Electric Railways" by Bion J. Arnold, chairman of the board of supervising engineers, Chicago traction. Followed by general discussion.

Reports of committees on: (b) taxation matters; (c) on recommendations contained in president's address; (d) resolutions, and (e) nominations.

Unfinished business; election of officers; installation of officers; adjournment.

FRIDAY, OCTOBER 8

11:30 *a. m.*

Presentation of Testimonial from Panama-Pacific Exposition Company, commemorative of the 1915 meeting by exposition officers.

MEETINGS AND CONVENTIONS

The following list gives names of secretaries, date of next or regular meetings, and places of meeting of those associations which will meet during the next three months. The full list of meetings and conventions is published only in the first issue of the Railway Age Gazette for each month.

AMERICAN ASSOCIATION OF DINING CAR SUPERINTENDENTS.—H. C. Boardman, D. L. & W., Hoboken, N. J. Next meeting, October 21-23, 1915, Boston, Mass.

AMERICAN ELECTRIC RAILWAY ASSOCIATION.—E. B. Burritt, 8 W. 40th St., New York. Annual convention, October 4-8, 1915, San Francisco, Cal.

AMERICAN ELECTRIC RAILWAY MANUFACTURERS' ASSOCIATION.—H. G. McConnaughy, 165 Broadway, New York. Meetings with American Electric Railway Association.

AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 75 Church St., New York. Next meeting, November, 17, 1915, Chicago.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago. Next convention, October 19-21, 1915, Detroit, Mich.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—Chas. Warren Hunt, 220 W. 57th St., New York. Regular meetings, 1st and 3d Wednesday in month, except July and August, 220 W. 57th St., New York.

ASSOCIATION OF MANUFACTURERS OF CHILLED CAR WHEELS.—George W. Lyndon, 1214 McCormick Bldg., Chicago. Annual meeting, 2d Tuesday in October, 1915, New York.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago. Annual meeting, October, 1915.

BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—L. D. Mitchell, Detroit Graphite Co., Chicago, Ill. Meetings with American Railway Bridge and Building Association.

CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk, P. O. Box 7, St. Lambert (near Montreal), Que. Regular meetings, 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal, Que.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 176 Mansfield St., Montreal, Que. Regular meetings, 1st Thursday in October, November, December, February, March and April. Annual meeting, January, Montreal.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 Lawlor Ave., Chicago. Regular meetings, 2d Monday in month, except June, July and August, Hotel La Salle, Chicago.

CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York. Regular meetings, 2d Friday in January, May, September and November. Annual meeting, 2d Thursday in March, Hotel Statler, Buffalo, N. Y.

ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—Elmer K. Hiles, 2511 Oliver Bldg., Pittsburgh, Pa. Regular meetings, 1st and 3d Tuesday, Pittsburgh.

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—A. M. Hunter, 321 Grand Central Station, Chicago. Regular meetings, Wednesday, preceding 3d Thursday in month, Room 1856, Transportation Bldg., Chicago.

MAINTENANCE OF WAY AND MASTER PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—T. I. Goodwin, C. R. I. & P., Eldon, Mo. Next meeting, October 19-21, 1915, St. Louis, Mo.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, except June, July, August and September, Boston.

NEW YORK RAILROAD CLUB.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.

NIAGARA FRONTIER CAR MEN'S ASSOCIATION.—E. N. Frankenberger, 623 Brisbane Bldg., Buffalo, N. Y. Meetings, 3d Wednesday in month, New York Telephone Bldg., Buffalo, N. Y.

PEORIA ASSOCIATION OF RAILROAD OFFICERS.—M. W. Rotchford, 410 Masonic Temple Bldg., Peoria, Ill. Regular meetings, 3d Thursday in month, Jefferson Hotel, Peoria.

RAILROAD CLUB OF KANSAS CITY.—Claude Manlove, 1008 Walnut St., Kansas City, Mo. Regular meetings, 3d Saturday in month, Kansas City.

RAILROAD MEN'S IMPROVEMENT SOCIETY.—J. B. Curran, Erie R. R., 50 Church St., New York. Meetings, alternate Thursdays, October to May. Assembly Rooms of Trunk Line Association, 143 Liberty St., New York.

RAILWAY CLUB OF PITTSBURGH.—J. B. Anderson, Room 207, P. R. R. Sta., Pittsburgh, Pa. Regular meetings, 4th Friday in month, except June, July and August, Monongahela House, Pittsburgh.

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOCIATION.—J. Scribner, 1063 Monadnock Block, Chicago. Meetings with Association of Railway Electrical Engineers.

RAILWAY FIRE PROTECTION ASSOCIATION.—C. B. Edwards, Fire Ins. Agt., Mobile & Ohio, Mobile, Ala. Next meeting, October 5-7, 1915, Chicago.

RAILWAY REAL ESTATE ASSOCIATION.—Frank C. Irvine, 1125 Pennsylvania Station, Pittsburgh, Pa. Next meeting, October 13, 1915, Chicago.

RICHMOND RAILROAD CLUB.—F. O. Robinson, C. & O., Richmond, Va. Regular meetings, 2d Monday in month, except June, July and August.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August, St. Louis.

SALT LAKE TRANSPORTATION CLUB.—R. E. Rowland, David Keith Bldg., Salt Lake City, Utah. Regular meetings, 1st Saturday of each month, Salt Lake City.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—Carl Nyquist, C. R. I. & P., 1134 La Salle St. Sta., Chicago. Annual meeting, October 19-21, Colorado Springs, Colo.

SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant Bldg., Atlanta, Ga. Regular meetings, 3d Thursday, January, March, May, July, September, November, 10 A. M., Piedmont Hotel, Atlanta.

TRAFFIC CLUB OF CHICAGO.—W. H. Wharton, La Salle Hotel, Chicago.

TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 291 Broadway, New York. Regular meetings, last Tuesday in month, except June, July and August, Hotel Astor, New York.

UTAH SOCIETY OF ENGINEERS.—Frank W. Moore, 1111 Newhouse Bldg., Salt Lake City, Utah. Regular meetings, 3d Friday in month, except July and August, Salt Lake City.

WESTERN CANADA RAILWAY CLUB.—L. Ken, Immigration Agent, Grand Trunk Pacific, Winnipeg, Man. Regular meetings, 2d Monday, except June, July and August, Winnipeg.

WESTERN RAILWAY CLUB.—J. W. Taylor, 1112 Karpen Building, Chicago. Regular meetings, 3d Tuesday in month, except June, July and August, Karpen Bldg., Chicago.

WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, 1735 Monadnock Block, Chicago. Regular meetings, 1st Monday in month, except January, July and August, Chicago. Extra meetings, except in July and August, generally on other Monday evenings. Annual meeting, 1st Wednesday after 1st Thursday in January, Chicago.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF JUNE, 1915

Name of road.	Average mileage operated during period.	Operating revenues: Freight.	Passenger.	Total. inc. misc.	Operating expenses: Maintenance: Way and structures.	Of equipment.	Traffic.	Trans-portation.	Miscel-laneous.	General	Total.	Net from railway operation	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
Chicago Great Western	1,427	$804,203	$271,476	$1,182,131	$177,586	$144,264	$49,430	$397,246	$7,939	$24,223	$799,965	$382,166	$49,228	$332,813	$99,931
Chicago, Terre Haute & Southeastern	374	142,848	14,227	160,745	22,966	10,344	3,221	44,785	759	10,246	92,321	68,424	2,141	66,032	21,453

FISCAL YEAR, 1915

Chicago Great Western	1,427	$9,645,527	$3,074,050	$13,920,685	$1,876,924	$2,398,216	$561,526	$5,150,730	$85,868	$384,092	$10,446,567	$3,474,118	$580,026	$2,889,931	—$37,409
Chicago, Terre Haute & Southeastern	373	1,938,417	189,622	2,186,268	286,609	486,720	41,823	667,924	10,523	118,831	1,612,431	573,837	134,641	438,945	193,962

MONTH OF JULY, 1915

Name of road.	Average mileage operated during period.	Operating revenues: Freight.	Passenger.	Total. inc. misc.	Operating expenses: Maintenance: Way and structures.	Of equipment.	Traffic.	Trans-portation.	Miscel-laneous.	General	Total.	Net revenue from railway operation	Railway tax accruals.	Operating income (or loss.)	Increase (or decr.) comp. with last year.
Alabama & Vicksburg	143	$75,999	$34,760	$121,653	$17,358	$30,815	$3,685	$43,539	$2,067	$5,417	$102,882	$18,771	$7,750	$11,021	$3,032
Atlantic City	170	79,331	271,024	360,261	23,622	24,172	2,244	145,018	79	3,734	198,866	161,395	10,000	151,395	10,494
Baltimore & Ohio System	4,535	6,724,560	1,307,008	8,670,752	836,551	1,650,836	164,758	2,690,320	43,380	208,241	5,593,840	3,076,912	287,407	2,785,538	784,788
Boston & Maine	2,302	2,269,368	1,461,418	4,099,236	515,644	516,346	50,308	1,663,734	18,088	91,896	2,856,016	1,243,220	162,787	1,080,433	409,358
Central Vermont	411	205,925	88,855	320,602	44,598	52,385	8,272	133,690	1,066	7,042	247,051	73,551	15,590	57,961	10,851
Chicago & Eastern Illinois	1,282	835,458	258,597	1,191,595	228,693	291,210	22,258	420,130	7,259	41,760	1,009,105	182,490	53,600	128,751	—236,402
Delaware & Hudson Co.—R. R. Dept.	886	1,642,683	285,214	2,045,150	166,469	293,274	34,125	639,061	16,218	64,574	1,212,527	832,623	56,500	776,123	106,474
Denver & Rio Grande	2,577	1,277,850	536,972	2,002,400	383,769	325,229	39,306	521,139	66,882	46,941	1,383,267	619,133	90,000	529,082	92,418
Denver & Salt Lake	255	103,221	47,786	159,170	20,721	26,296	2,900	46,511	.....	5,938	102,255	56,915	8,021	48,895	6,023
Duluth, Winnipeg & Pacific	185	99,682	16,113	119,301	12,448	12,754	1,660	35,151	103	6,208	68,324	50,977	5,897	45,080	34,663
Galveston, Harrisburg & San Antonio	1,351	592,491	243,714	873,959	112,374	130,954	30,906	345,747	11,704	31,532	662,838	211,121	46,269	164,474	22,809
Georgia	307	125,199	63,343	205,778	24,473	36,103	12,307	83,529	98	7,366	163,875	41,902	3,225	38,660	—5,194
Georgia, Southern & Florida	395	107,635	53,826	186,498	22,044	32,905	6,989	71,522	.....	9,862	143,323	43,175	10,122	32,811	—3,161
Houston, East & West Texas	191	79,139	29,192	115,422	28,378	20,722	2,235	35,285	622	3,238	90,295	25,127	5,836	19,373	—14,431
Houston & Texas Central	895	381,304	137,061	558,867	83,662	97,943	16,633	188,506	5,408	20,281	412,082	146,785	29,011	117,613	5,385
Missouri Pacific	3,931	1,632,868	496,758	2,331,250	341,419	473,028	59,898	871,062	12,056	86,819	1,843,733	487,517	99,418	386,551	—245,276
Mobile & Ohio	1,122	742,239	104,334	896,356	98,846	189,585	34,630	335,136	2,065	30,839	691,101	205,254	32,636	172,431	—55,071
Monongahela	75	120,464	2,305	124,810	18,674	3,245	517	23,209	.....	3,053	48,698	76,113	2,500	73,613	.....
Nashville, Chattanooga & St. Louis	1,231	623,834	236,288	942,303	112,684	178,617	45,725	337,798	9,064	32,814	716,830	225,473	26,000	199,365	—7,308
Nevada Northern	165	133,916	10,904	148,747	19,061	11,497	628	26,673	65	4,164	62,087	86,660	8,906	77,754	20,053
New Orleans Great Northern	283	101,046	27,792	140,970	17,088	23,215	2,847	41,124	163	5,945	90,382	50,588	3,892	46,669	—12,942
New Orleans & North Eastern	204	212,173	47,784	286,336	26,024	55,224	10,425	89,815	5,619	11,776	198,881	87,454	14,850	72,604	—2,409
New Orleans, Mobile & Chicago	403	107,908	24,192	139,596	24,364	21,201	4,212	46,886	.....	7,508	104,172	35,425	6,399	28,981	19,119
New Orleans, Texas & Mexico	286	104,255	29,179	141,037	24,713	21,884	4,289	44,580	.....	10,477	105,943	35,093	1,501	33,593	2,633
New York Central Railroad	5,979	8,714,429	4,440,587	15,397,769	1,781,507	2,527,619	242,814	4,606,815	218,103	386,152	9,763,010	5,634,759	773,611	4,859,516	.....
New York, Chicago & St. Louis	569	773,608	151,455	964,788	109,680	146,497	49,606	395,827	5,827	20,885	728,322	236,466	42,000	194,450	—4,015
New York, New Haven & Hartford	2,005	2,967,945	2,646,425	6,247,659	853,452	710,958	36,996	2,041,089	47,883	130,997	3,818,333	2,429,326	254,500	2,174,760	613,134
New York, Ontario & Western	569	503,333	323,529	961,572	118,361	124,809	8,002	291,857	.....	15,294	558,322	403,250	20,983	382,255	20,394
New York, Philadelphia & Norfolk	112	406,650	44,426	481,464	42,001	82,583	5,233	163,098	4,492	10,909	308,317	173,147	9,500	163,647	10,424
New York, Susquehanna & Western	140	171,747	51,593	261,874	16,579	26,950	1,691	102,227	.....	6,460	153,899	107,975	13,208	94,767	44,291
Norfolk & Western	2,040	3,838,673	490,531	4,463,345	619,878	780,245	52,182	1,098,052	8,159	68,204	2,611,321	1,856,024	168,000	1,687,826	593,512
Norfolk Southern	907	197,242	105,074	332,445	44,439	46,241	7,730	119,370	64	17,302	235,146	97,299	12,351	84,948	9,090
Northern Pacific	6,471	3,327,625	1,443,736	5,349,784	974,008	784,545	111,433	1,562,224	109,517	86,962	3,554,434	1,795,350	377,148	1,417,822	—227,924
Oregon Short Line	2,253	1,183,212	555,922	1,901,393	259,602	226,247	38,144	435,781	36,482	53,764	1,048,171	853,221	114,117	738,722	129,742
Oregon-Washington R. R. & Nav. Co.	2,027	794,806	477,436	1,396,980	151,480	157,883	44,137	405,314	15,156	59,398	828,782	568,198	95,907	472,161	—2,523
Panhandle & Santa Fe	670	240,243	85,474	345,384	90,850	66,441	4,053	88,001	.....	8,999	257,950	87,434	11,108	76,326	15,269
Pennsylvania Company	1,757	4,156,999	974,263	5,640,024	737,451	7,779,372	73,135	1,684,828	30,814	118,698	3,424,299	2,215,726	256,618	1,958,903	582,011
Pennsylvania Railroad	4,528	11,793,493	3,529,884	16,755,645	2,143,938	2,938,955	190,144	5,476,323	232,546	410,376	11,392,282	5,363,363	626,529	4,730,292	1,169,409
Pere Marquette	2,262	942,199	441,913	1,552,603	231,301	281,177	32,953	535,193	5,147	41,170	1,126,841	425,762	46,889	378,866	111,229
Philadelphia, Baltimore & Washington	717	1,092,666	643,612	1,904,687	270,540	344,532	26,078	714,071	24	49,122	1,404,367	500,320	54,175	445,993	134,215
Philadelphia & Reading	1,120	3,242,347	559,621	4,008,406	366,144	725,836	38,354	1,333,091	11,293	71,260	2,544,050	1,464,356	100,666	1,363,224	283,867
Pittsburgh & Lake Erie	225	1,416,590	153,136	1,655,433	149,376	241,256	11,099	332,099	3,321	27,585	764,737	890,696	49,500	841,195	273,074
Pittsburgh, Cin., Chicago & St. Louis	1,479	2,288,100	733,831	3,390,186	492,616	617,274	63,624	1,143,193	25,648	84,628	2,426,983	963,203	161,617	801,298	—76,911
Pittsburgh, Shawmut & Northern	294	157,339	9,871	170,355	27,944	39,957	1,983	46,945	.....	5,443	122,272	48,083	1,660	46,423	51,136
Port Reading	21	100,395	.....	129,691	12,306	11,238	38	38,361	.....	107	62,050	67,640	10,000	57,640	15,067
Richmond, Fredericksburg & Potomac	88	150,440	71,003	252,927	18,843	29,963	2,815	84,807	2,942	7,128	146,499	106,427	7,586	98,755	1,526
Rutland	468	160,409	113,779	313,758	46,045	49,569	10,888	106,425	1,012	5,560	219,499	74,258	16,859	77,399	29,058
Saint Louis & San Francisco	4,750	2,209,049	934,890	3,358,558	535,579	537,610	62,621	1,065,798	.....	105,850	2,288,462	1,070,097	117,491	950,369	—6,201
St. Joseph & Grand Island	258	77,998	27,393	116,156	26,125	23,840	4,406	43,308	.....	4,962	102,642	13,513	7,620	5,893	—62,972
St. Louis, Brownsville & Mexico	548	108,495	58,879	183,307	33,703	20,243	5,176	65,128	.....	9,537	133,549	49,758	6,500	42,470	7,167
St. Louis, Iron Mountain & Southern	3,363	1,782,488	463,998	2,432,049	352,590	519,126	64,980	757,852	6,792	58,226	1,759,040	673,008	110,935	560,178	—216,891
St. Louis Merchant's Bridge Terminal	9	.....	135	140,356	18,141	9,012	773	68,328	.....	7,083	103,336	37,020	6,540	30,480	—4,878
St. Louis, San Francisco & Texas	235	69,187	22,315	112,039	22,277	15,149	1,926	40,924	.....	4,018	84,293	27,746	1,216	26,530	—16,469
St. Louis Southwestern	943	403,716	107,007	547,418	40,426	97,970	25,438	152,173	3,453	23,008	342,353	205,065	29,721	174,702	—8,380
St. Louis Southwestern of Texas	811	248,117	80,861	354,209	49,268	67,484	14,678	138,266	651	16,027	272,073	82,136	15,025	67,008	92,774

REVENUES AND EXPENSES OF RAILWAYS

Month of July, 1915—*Continued*

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses					Net revenue from railway operation	Railway tax accruals.	Operating income (or loss.)	Increase (or decr.) comp. with last year.
		Freight.	Passenger.	Total. inc. misc.	Maintenance Way and structures.	Maintenance Of equipment.	Traffic.	Transportation.	Miscellaneous.	General.	Total.				
San Antonio & Aransas Pass	724	$176,246	$89,325	$289,617	$65,328	$61,384	$6,201	$134,307	.....	$11,441	$278,620	$10,997	$15,732	—$4,736	—$57,835
San Pedro, Los Angeles & Salt Lake	1,132	506,190	475,086	1,083,462	97,647	124,146	30,707	274,711	32,563	16,983	576,757	506,705	51,303	455,343	204,988
Seaboard	3,123	1,081,160	382,663	1,627,646	192,538	240,744	65,225	587,565	7,403	57,608	1,151,083	476,563	92,244	383,662	—50,287
Southern	7,022	3,314,013	1,421,839	5,211,635	700,841	839,627	160,729	1,819,557	26,663	161,001	3,663,807	1,547,828	228,327	1,317,647	148,175
Southern Pacific	6,936	5,373,380	3,859,834	10,258,438	1,008,042	1,245,052	207,631	2,919,003	220,888	223,453	5,815,822	4,442,616	418,056	4,023,836	1,250,875
Spokane, Portland & Seattle	556	196,660	187,202	425,955	48,969	34,309	9,139	95,157	4,523	11,902	203,999	221,957	53,400	168,541	—33,392
Staten Island Rapid Transit Co	11	39,960	38,103	112,951	6,440	3,999	940	36,053	.....	2,490	49,922	63,030	5,000	58,030	2,173
Tennessee Central	294	85,300	36,739	129,874	28,016	17,579	5,617	45,893	.....	6,670	103,776	26,099	4,676	21,422	—18,557
Terminal R. R. Assn. of St. Louis	35	.....	220	214,138	18,496	16,347	909	71,179	.....	5,085	112,017	102,120	27,338	74,783	—835
Texas & New Orleans	468	243,516	85,224	356,111	46,079	86,596	8,855	117,642	7,399	10,072	272,457	79,654	18,335	60,997	43,421
Texas & Pacific	1,944	1,016,023	338,309	1,472,559	187,336	234,611	35,782	563,236	10,674	41,179	1,071,602	406,957	76,000	324,474	69,941
Toledo & Ohio Central	436	318,960	55,173	402,967	66,280	62,087	6,846	141,163	1,872	9,889	288,136	114,830	20,852	93,979	100,297
Toledo, Peoria & Western	248	46,445	39,425	92,026	18,234	29,287	2,455	40,412	.....	4,100	94,488	—2,462	6,100	—8,562	—2,051
Toledo, St. Louis & Western	451	332,332	38,388	396,568	44,465	70,950	16,395	138,502	.....	8,203	278,515	118,052	19,542	98,511	—7,422
Union Pacific	3,617	2,954,294	1,074,406	4,548,494	740,218	561,061	120,381	1,087,723	99,662	110,804	2,717,151	1,831,343	193,420	1,636,976	44,663
Union R. R. of Baltimore	9	92,713	18,686	113,203	17,937	.....	.....	4,437	.....	2,286	24,661	88,542	5,806	82,736	—29,277
Union R. R. of Pennsylvania	31	.....	.....	515,717	39,190	96,292	109	156,703	.....	3,122	295,416	220,302	6,001	214,301	142,959
Vandalia	910	603,333	208,078	921,255	137,634	167,186	23,350	328,507	9,710	22,994	689,380	231,874	34,152	197,712	15,856
Vicksburg, Shreveport & Pacific	171	70,696	35,783	118,934	22,071	25,033	3,326	42,249	2,181	4,733	99,593	19,342	8,100	11,242	—3,396
Virginian	504	497,083	39,172	571,857	70,273	97,852	5,151	113,561	12,650	15,054	310,653	261,204	20,000	241,204	96,444
Virginia & Southwestern	240	126,662	15,187	146,209	23,993	34,323	2,261	40,265	.....	4,152	104,994	41,215	6,667	34,549	—14,957
Wabash	2,519	1,633,070	579,025	2,422,483	309,835	406,588	93,227	934,574	15,760	70,928	1,918,823	503,660	82,309	421,090	—235,136
Washington Southern	36	.....	37,279	115,760	15,971	13,789	1,387	39,598	1,260	3,228	75,234	40,526	3,540	36,986	8,612
Western Maryland	664	701,413	94,445	833,177	104,231	140,470	21,820	260,244	6,380	19,272	550,977	282,200	27,000	255,200	88,774
West Jersey & Seashore	356	209,137	622,985	895,105	107,459	87,048	11,599	271,250	3,304	14,999	495,658	399,447	28,700	370,624	59,483
Western Pacific	941	336,208	311,436	702,452	106,632	63,679	24,534	183,953	23,785	18,592	421,175	281,277	31,232	249,805	156,138
Western Ry. of Alabama	133	51,023	34,014	94,636	17,485	24,018	5,710	28,415	1,541	4,708	81,877	12,760	5,113	7,636	2,007
Wheeling & Lake Erie	512	452,708	63,174	561,805	99,403	85,183	7,976	179,214	1,361	13,391	386,526	175,279	33,836	141,443	30,576
Yazoo & Mississippi Valley	1,382	692,066	165,047	900,789	178,671	168,033	18,226	311,494	1,380	13,391	386,526	175,279	33,836	141,443	30,576

Traffic News

The number of vessels moved through the American locks at the Sault Ste. Marie canal on Saturday, September 18, was 118, the largest movement ever recorded in one day.

The Western Classification Committee has announced a hearing to be held on October 1, on application for changes in ratings, rules, etc., in Classification No. 53, on musical instruments and wooden ware.

Announcement was made by the War Department at Washington on Monday of this week that because of a landslide near Gold Hill the Panama Canal would be closed to traffic probably for at least ten days.

Eugene Morris, chairman of the Central Freight Association, has issued an amended export rate tariff giving rates from shipping centers in Central Freight Association territory to Pacific coast terminals, effective on September 15.

The Trans-Missouri Freight Bureau has been absorbed by the Western Trunk Line Committee. W. A. Poteet, who was chairman of the former at Kansas City, has moved part of his office force to the Chicago office of the Western Trunk Line Committee and will be assistant to Chairman E. B. Boyd.

Representatives of lumber associations from all parts of the country held a conference at Chicago on September 15 to discuss the proposed investigation by the Interstate Commerce Commission of lumber rates and classification. The lumbermen are seeking a number of important changes in classification.

A meeting of the Official Classification Committee was held in New York on September 21st for consideration of subjects enumerated in Docket No. 24, including recommendations of the Committee on Uniform Classification and other matters. A later hearing will be held in the rooms of the Central Freight Association, Chicago, on October 6.

The Missouri, Oklahoma & Gulf of Texas has recently begun operation over its own rails to the following points in Texas: Plano, Carrollton, Dallas, Ft. Worth and North Ft. Worth. Traffic arrangements have been effected with the Missouri Pacific whereby the M. O. & G. now runs a fast through freight train leaving daily from Kansas City for these cities.

The College of Commerce of the University of Cincinnati has announced the opening of its evening classes in traffic management and problems of the traffic manager on September 23. The traffic courses are in charge of Guy M. Freer, traffic manager of the Cincinnati Chamber of Commerce, and W. S. Groom, traffic manager of the Whitaker Paper Company.

The Atlanta & St. Andrews Bay Railroad, which runs from Dothan, Ala., southward 82 miles to Panama City on the Gulf of Mexico, has made an arrangement with the Steamship "Brunswick" for a rail and water freight line to and from New Orleans; and proposes to carry cotton through from Dothan to New Orleans at a rate of 13 cents per 100 lb., less than all rail rates between those two points.

In addition to the five demonstration farms now operated by the Nashville, Chattanooga & St. Louis under the supervision of Special Agent Joseph H. Judd, arrangements have been made for a new demonstration farm at Martin, Tenn., which will be in cultivation next year. At present the company operates farms at Decherd, Sewanee, Murfreesboro, Tullahoma and Dickson. With the farm at Martin the total acreage will be increased to 425.

The Salt Lake & Ogden, an electric line operating between Ogden and Salt Lake City, has filed tariffs with the Interstate Commerce Commission, effective on October 1, the giving through rates which will be put in effect as the result of a new traffic arrangement with the Ogden, Logan & Idaho. The road heretofore has not considered itself subject to the jurisdiction of the Interstate Commerce Commission, as it operates entirely in Utah.

The Chicago, Milwaukee & St. Paul and the Chicago & North Western have filed tariffs with the Interstate Commerce

Commission effective on October 1, cancelling the application of the Illinois classification to traffic moving between Milwaukee and points in the state of Illinois and St. Louis, Mo., and the substitution of the Western classification. The Merchants' & Manufacturers' Association of Milwaukee has announced its intention of protesting against the proposed change to the Interstate Commerce Commission and of asking for a suspension of the tariffs.

At the hearing before Judge Youmans of the United States district court at Oklahoma City on the application of the Oklahoma roads for an injunction to restrain the operation of the Oklahoma two-cent fare law. H. C. Phillips, secretary of the president's conference committee on valuation and formerly valuation engineer of the Atchison, Topeka & Santa Fe, testified in detail regarding the valuation of that road's property in Oklahoma. A. L. Conrad, statistician for the Atchison, Topeka & Santa Fe, introduced an exhibit showing the cost of preparing for the trial of rate cases in Oklahoma. In the year 1913 alone this road spent for this purpose $111,980 in Oklahoma.

Milk Rates on the Boston & Maine

The Boston & Maine has given notice in Boston that there will be a general revision of rates for the transportation of milk to that city; whereat there is much loud protest. The protests are from dealers and consumers, or alleged spokesmen for consumers, who fear that the cost of their milk is to be increased. From those whose rates will be reduced nothing is heard. The company puts its case frankly before the public in an advertisement in the newspapers, which says:

"The Boston & Maine Railroad, subject to the approval of the public authorities, plans to revise its charges for transporting milk. Some points have rates only by passenger train, other only by freight, and some points by both. Where a freight rate exists, it is three-fourths of the passenger train rate. There are also variations in the rates at different points similarly situated. The result of all this is to give much lower rates from Maine and Northern New Hampshire than from Vermont. For example, Foxcroft, Maine, 256 miles from Boston, has a leased car freight rate of $37 a day, while a similar shipment from Vergennes, Vermont, 213 miles from Boston, pays a passenger rate of $63.96 a day.

The management believes the freight rate should be abolished, and that the passenger rates should be rearranged to give the same rate to localities similarly situated. With that end in view, it has prepared a new tariff, lowering rates in some cases, raising them in some others, and doing away with the freight rates in all.

The new rates are lower than those charged by other railroads entering Boston, and lower than those into New York or any other large city.

No carload rate to [from] any point within 165 miles of Boston is increased. Those between 75 and 150 miles are reduced to make the basis uniform.

The largest increase at any one point on the can rate to Boston, in baggage car service, is two cents, or less than a quarter of a cent a quart.

The longest journey of any leased car today is 284 miles. The largest increase to Boston on the leased car rate of the large shippers is less than one-third of a cent a quart. This is for a distance of 300 miles. For shorter distances this increase is smaller.

Cream retails at from three to six times the price of milk, this price being fixed on the amount of butter fat it contains. Cream is now carried at the milk rate. If it is damaged or spilled, the railroad must pay the owner the cream price. Because of this, the new rate for cream has been made one and one-half times the milk rate.

THE MADEIRA-MAMORE RAILWAY OF BRAZIL.—The Madeira-Mamore Railway, probably the most isolated railway in the world, is located far in the interior of South America and affords a means of getting around a chain of dangerous rapids which prevent navigation through portions of the Madeira, Mamore and Beni rivers. The route followed by the railway was surveyed a number of years ago by Colonel George Church, a distinguished American engineer. Most of the party died from diseases due to the climate. Several attempts were made before the road was finally built.—*The South American.*

Commission and Court News

INTERSTATE COMMERCE COMMISSION

The commission has extended the effective date of its order in the Western Rate Advance Case in so far as it relates to packing house products from September 30 to December 31.

Commissioner Clark held a hearing at the Hotel LaSalle in Chicago, on September 17, on the application of the Southern Pacific for permission to continue the operation of the vessels of the Associated Oil Company, a subsidiary of the railroad, under the provisions of the Panama canal act.

The Louisiana Railroad Commission has filed a complaint with the Interstate Commerce Commission, making 17 Texas roads defendants, asking the commission to extend the effects of the Shreveport rate case order to the connections and subsidiaries of the principal defendants. A hearing was held at New Orleans on September 17.

A hearing will be held at the office of the commission in Washington on September 28 and 29 to consider the code of rules prepared by the chief inspector of locomotive boilers in accordance with the law approved March 4, 1915, extending the provisions of the boiler inspection act to include the entire locomotive and tender. These rules, excepting rules numbered 18, 29, and 31, were agreed to at a conference held in Washington, August 23 to 28, 1915, between the chief inspector of locomotive boilers, a committee representing and authorized to act for the carriers, and a committee representing railway employees.

At a hearing before Examiner Gutheim at St. Louis on September 15, representatives of St. Louis shippers presented evidence in support of their complaint that recent advances in interstate freight and passenger rates affecting shipments from St. Louis into Illinois territory are discriminatory as compared with the rates from Chicago to the same points, which were not advanced because the Illinois Public Service Commission has thus far declined to allow any advances in the rates under its jurisdiction. The St. Louis witnesses contended that the discriminations were having a serious effect on their business in competition with Chicago.

Supplemental Hearing on Western Rate Advances

Examiner E. W. Hines, of the Interstate Commerce Commission, began a hearing at the Hotel LaSalle, Chicago, on September 20, on proposed advances in freight rates on the railroads running west of Chicago, on a number of commodities on which advanced rates were filed during the progress of the hearings in the western rate advance case, and which were therefore postponed until a hearing which was originally set for July. The carriers postponed the advances so that the hearing might be held in September. The hearing involves rates on agricultural implements, canned goods and furniture, beer and liquor, boots and shoes, cement, clothing, granite and marble, iron and steel, wire, lumber, lime, machinery, oil, paper, steel rails, ties, structural iron, sugar, sandstone and other commodities, as well as several proposed changes in rules.

Rates on Lumber from the South to Ohio River Crossings

In re Rates on Lumber from Southern Points to the Ohio River Crossings and Other Points. Opinion by Commissioner McChord:

The original report in this case permitted the carriers to increase their rates to the north bank Ohio river points from the territory east of the Mississippi river in those instances in which such increases were necessary to effect a spread of one cent per 100 lb. between opposite points at the same crossing. The former finding is now modified for the purpose of alining the rates of the Louisville & Nashville to St. Louis from stations on its line south of Decatur, Ala., with the rates of the other lines serving the same general territory, and to permit the rates from Helena, Ark., to Cairo, Ill., and St. Louis, Mo., to be increased to the Memphis basis. (36 I. C. C., 137.)

STATE COMMISSIONS

The California Railroad Commission has refused to sanction for intrastate shipments increases in express rates equivalent to those recently granted by the Interstate Commerce Commission.

The Nebraska Railway Commission, after a conference with a number of railroad officers, has announced that it will consider allowing a number of exceptions to the long and short haul rule when the railroads submit a list of instances in which the present rule is said to work a hardship.

The Louisiana Railroad Commission has ordered the railroads entering New Orleans to prepare and file with the commission not later than January 1 a tariff of reasonable rates, rules and regulations for the joint handling of freight between points within the switching district of the city of New Orleans.

The Louisiana Railroad Commission has issued an order authorizng the railroads operating in the state to use Southern Classification No. 41 and supplements 1, 3 and 4 thereof, on Louisiana business, but supplements 2, 5 and 6 have been objected to by the New Orleans Joint Traffic Bureau and the Baton Rouge Chamber of Commerce, and are ordered held in abeyance until further notice.

PERSONNEL OF COMMISSIONS

A. Z. Patterson, private secretary of Governor Major of Missouri, has been appointed assistant counsel of the public service commission in charge of the legal work in connection with the valuation of railroad property in the state.

COURT NEWS

Passenger's Duty to Board Right Train

The Georgia Supreme Court holds that it is the duty of the purchaser of a ticket, or one who desires to become a passenger on a train, to ascertain, before boarding it, that it stops at his station. Where he fails to do so, and the train is not scheduled to stop there, the railroad may eject him at the last regular stopping place before reaching the desired destination.—Southern Ry. Co. v. Bailey (Ga.), 85 S. E. 847.

Segregation of Races—Exception

The Alabama Supreme Court holds that the provisions of the statute providing for separate accommodations on trains for white and negro passengers, and making it a misdemeanor for a person to go into and ride on a coach to which he does not belong, do not apply where a white sheriff attempts to travel with a negro prisoner, and hence the two cannot be assigned to separate coaches. In such a case the conductor may, in his discretion, assign them to any coach or compartment of the train.—Spenny v. Mobile & Ohio (Ala.), 68 So. 870.

Liability for Freight—Undisclosed Principal

The Alabama Court of Appeals holds that a consignor of goods cannot change or escape his liability as such after entering into the contract of shipment and dealing with the railroad as the consignor, by notifying the railroad after his shipment has been carried to its destination and rejected by the consignee that he was acting merely as the agent of the true consignor, when that fact was not previously disclosed in the transaction.—Cincinnati, N. O. & T. P. v. Vredenburgh Sawmill Co. (Ala.), 69 So. 228.

This principle was applied in another case, where oranges were consigned to a commission merchant for sale. Through mistake the railroad company made an undercharge, which the commission merchant refused to make good, having already sent the proceeds to the shipper. The commission merchant had not previously informed the railroad company that he was not the owner of the goods. It was held that he was liable for the undercharge.—S. F. Cornelius & Co. v. Central of Georgia (Ala.), 69 So. 331.

Maintaining Flagmen at Crossings

The Erie sought the review of an order of the New Jersey Board of Public Utility Commissioners requiring the maintenance of flagmen at two crossings during the 24 hours of the day. At each of the crossings there was the ordinary crossing sign and also approach boards reading "Railroad Crossing, 500 Feet." In addition there was an automatic audible signal, a bell which would start ringing when a train was 2,000 ft. from the crossing. The New Jersey Supreme Court held that the order was too broad and should be limited to requiring the road to keep a flagman on duty at the crossings covering the operation of all [regular?] trains over such crossings.—Erie v. Board (N. J.), 95 Atl. 177.

Duty Toward Person Voluntarily Assisting Station Agent

In an action for injury caused by a heavy trunk falling on the plaintiff's foot the Georgia Court of Appeals holds that one who, at the request of a station agent, who has no apparent authority to employ other servants, voluntarily undertakes to assist in loading a trunk, is a mere volunteer, and the company owes him no duty except that which it owes to a trespasser; that is, not to injure him willfully and wantonly after his peril is discovered. The position of the plaintiff at one end of the trunk was not so obviously perilous to the porter at the other end as to charge the porter (and through him the company) with willful and wanton negligence in letting his end of the trunk fall to the ground.—Southern Ry. Co. v. Duke (Ga.), 85 S. E. 975.

Rights of Railroad in Crossing Another

The statutory right of one railroad to cross another is in the first instance dependent upon a reasonable necessity for such a crossing; and, where such a necessity is shown, the crossing sought must be so located and constructed as not to inflict any unnecessary injury upon the road to be crossed. But, the Alabama Supreme Court holds, the statutes which give the right to cross do not require that there shall be no injury whatever to the rights of the road crossed, or require the selection of the place and mode which will least injure the company crossed, without regard to the interests and necessities of the crossing company, which must also be considered, and the question determined according to the circumstances of the particular case. The right to cross, though given in general terms, is not confined to the main tracks of either road, but applies to sidings and all tracks, and the making of one crossing, or even of several, does not necessarily exhaust the general right to cross.—Mobile & Birmingham v. Louisville & Nashville (Ala.), 68 So. 905.

EFFECT OF WAR ON RAILROADS IN MEXICO.—As a result of the four years' warfare and the purposeless destruction which has proceeded throughout the Republic of Mexico, there is hardly a line which has not been reduced either to uselessness or to hopeless wreck. Not since the first track was laid in Mexico in 1857, has such a condition been known. The Mexican Railway, the pioneer enterprise of the state, is, perhaps, in the most parlous condition and worse off than it has been at any time since the revolution began. The entire track, with the exception of about 25 miles out of Mexico City, which, for a short while, was operated intermittently by the company, has been out of its control since November 18 last. Since then an immense amount of destruction—mostly of a mischievous character—has been committed; miles of the track have been torn up, and a great deal of the equipment has been removed from the company's stores and distributed over other railways. The position of the Mexican Southern is hardly less serious. General Carranza took possession of the Interoceanic Railway (of which the Southern is a leased line) in August last; the Interoceanic has been out of possession ever since, and the military opposition has been continuous. There does not appear to have been quite so much destruction committed on the property of the Mexican Southern. The National Railways of Mexico, which now include the lines of the Central Railway, are likewise in a serious condition. The Vera Cruz Railway, a British undertaking, is more or less in the same condition, while the Mexican Northwestern is described as a wreck from end to end. * * * The restoration of these railways will require scores of millions of dollars.—*Railway Gazette, London.*

Railway Officers

Executive, Financial, Legal and Accounting

E. F. Bromhall has been appointed secretary of the Missouri, Kansas & Texas, with headquarters at Parsons, Kan., succeeding W. R. Snedaker, assigned to other duties.

Sidney Aronstein has been elected vice-president of the Georgia Coast & Piedmont, in charge of territorial development, with headquarters at New York City, succeeding T. D. Rhodes, resigned.

Operating

W. H. Haley has been appointed superintendent of car service of the Missouri Pacific, with office at St. Louis, Mo., vice W. I. Stine, resigned to enter the service of the American Refrigerator Transit Company.

L. U. Morris, superintendent of the eastern division of the El Paso & Southwestern at Tucumcari, N. M., has been appointed general superintendent of the system with headquarters at El Paso, Tex., vice G. F. Hawks, promoted. C. D. Beeth, trainmaster on the eastern division, has been promoted to the position left vacant by Mr. Morris. C. B. Eifort has been appointed trainmaster to succeed Mr. Beeth at Tucumcari.

T. S. Mahoney, superintendent of the transcontinental division of the Texas & Pacific, has been transferred from Texarkana, Tex., to Ft. Worth, where he will take charge of the Ft. Worth division, into which have been consolidated the transcontinental and joint track divisions and the Ft. Worth terminals. G. B. Johnson, superintendent of the joint division, and A. E. Pistole, superintendent of terminals, have been transferred to other duties.

Engineering and Rolling Stock

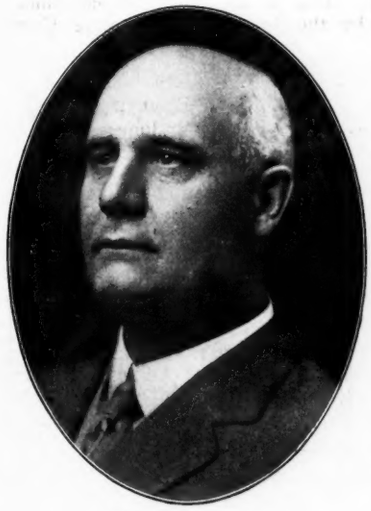
Frederick E. Morrow, who was appointed assistant chief engineer of the Chicago & Western Indiana and the Belt Railway Company, of Chicago, on September 1, graduated from the civil engineering course, at Purdue University in 1904. From June to November of that year he was employed in the engineering department of the Illinois Steel Company. From that time until April, 1907, he was in the service of the Chicago & North Western in the consecutive capacities of rodman, instrument man and assistant engineer. He then took a position as field engineer in the division of track and roadway of the Board of Supervising Engineers, Chicago Traction, which he held during the rehabilitation of the Chicago surface lines. In April, 1910, he entered the C. & W. I. organization as office engineer. In March, 1913, he was promoted to principal assistant engineer, and held this position until his recent appointment as assistant chief engineer of both the C. & W. I. and the Belt Railway.

F. E. Morrow

A. A. McCree has been appointed roadmaster of the Northern Pacific, with headquarters at Tacoma, Wash. Effective September 16.

J. R. Holman, chief engineer of the Oregon-Washington Railroad & Navigation Company, has been granted an indefinite leave of absence. Samuel Murray, bridge engineer, has been appointed acting chief engineer, with headquarters at Portland, Ore. Effective September 14.

W. O. Thompson, whose appointment as superintendent of rolling stock of the New York Central for the lines west of Buffalo, with headquarters at Cleveland, Ohio, has already been announced in these columns, was born in July, 1861, at Clayton, Mich., and was educated at Adrian, Mich., high schools. He began railway work in 1880, on the Ft. Wayne, Jackson & Saginaw, and remained with that road until it became a part of the Lake Shore & Michigan Southern. From 1884 to 1890 he served as a locomotive engineman, and then was appointed traveling engineer of the Lake Shore & Michigan Southern, remaining in that position until August, 1893. He was then engine despatcher from 1893 to 1900 on the same road. In 1901 he was appointed general locomotive inspector of the New York Central & Hudson River. The following year he was appointed superintendent of motive power on the Rome, Watertown & Ogdensburg division, and in 1907 became district master car builder at East Buffalo, N. Y., which position he held at the time of his recent appointment as superintendent of rolling stock for the New York Central lines west of Buffalo, as above noted.



W. O. Thompson

Traffic

G. G. Early, chief of tariff bureau, of the Wabash Pittsburgh Terminal and the West Side Belt Railroad, has been appointed assistant general freight agent of these lines, with office at Pittsburgh, Pa., and his former position has been abolished.

E. S. Morgan, general southwestern freight agent of the Queen & Crescent Route at Dallas, Tex., having resigned to engage in other business, the position of general southwestern freight agent has been abolished. G. C. Whitney, commercial agent at Greensboro, N. C., has been appointed commercial agent, with office at Dallas; L. R. Gardner, traveling freight agent at San Antonio, has been promoted to commercial agent, and E. J. West has been appointed commercial agent at Greensboro, succeeding Mr. Whitney.

W. M. Kirkpatrick, assistant freight traffic manager, eastern lines, of the Canadian Pacific with office at Montreal, Que., having been appointed an officer in the army, the following appointments are made until he returns to the company's service: H. E. Macdonell, general freight agent at Montreal, will perform the present duties of the assistant freight traffic manager; E. N. Todd, division freight agent at Montreal, will perform the duties of the general freight agent; A. O. Secord, district freight agent at Ottawa, Ont., will perform the duties of the division freight agent with office at Montreal, and J. J. Kelly will perform the duties of the district freight agent with office at Ottawa, Ont.

OBITUARY

A. J. Seifert, signal supervisor of the Chicago terminals division of the Pennsylvania Lines West, died on September 9.

William F. Fitch, formerly president of the Duluth South Shore & Atlantic, died at Marquette, Mich., at the age of 76. Mr. Fitch was born at Circleville, Ohio, on June 28, 1839, and entered railway service on October 14, 1851, as clerk in the general manager's office of the Chicago & North Western. His rise from the ranks to a position of consequence was rapid and in 1866 he became general manager of the Fremont, Elkhorn & Missouri Valley and Sioux City & Pacific railroads. In 1888 he was appointed general manager of the Duluth, South Shore & Atlantic, a position which he held until 1911. From 1888 until 1902 he also held the vice-presidency of the road, and from 1902 until 1911 the presidency.

Equipment and Supplies

LOCOMOTIVE BUILDING

THE HAVANA CENTRAL has ordered one 60-ton electric locomotive from the General Electric Company.

THE FAIRCHILD & NORTHEASTERN has ordered one Prairie type locomotive from Lima Locomotive Corporation. This locomotive will have 16 by 24 in. cylinders.

THE TEXAS & PACIFIC, reported in the *Railway Age Gazette* of last week as having ordered 13 locomotives from the Baldwin Locomotive Works, has ordered 7 Santa Fe type and 6 switching locomotives from that company.

THE NORFOLK & WESTERN has ordered 30 Mallet type (2-6-6-2) locomotives from the American Locomotive Company. These locomotives will have 22 and 35 by 32-in. cylinders, 56-in. driving wheels and a total weight in working order of 406,000 lb. They will be equipped with superheaters.

CHICAGO & NORTH WESTERN.—In the item in the *Railway Age Gazette* of last week giving the details of this company's recent order for 45 locomotives placed with the American Locomotive Company, the total weight in working order of six of the Pacific type locomotives was incorrectly given as 302,000 lb. instead of 229,000 lb. and that of the 12 Mikado type locomotives was incorrectly given as 165,000 lb. instead of 302,000 lb.

CAR BUILDING

THE CENTRAL OF GEORGIA is inquiring for prices on five passenger cars.

THE CINCINNATI, INDIANAPOLIS & WESTERN is inquiring for prices on 1,000 40-ton box cars.

THE BUFFALO, ROCHESTER & PITTSBURGH is inquiring for prices on 899 steel underframes for installation on old wooden box cars.

THE NEW YORK CENTRAL has ordered 1,000 freight cars each from the Standard Steel Car Company and the Pressed Steel Car Company for the Pittsburgh & Lake Erie, and 500 box cars from the American Car & Foundry Company for the Cincinnati Northern.

THE SOUTHERN RAILWAY, which has recently had 1,000 cars rebuilt and provided with steel under frames by the Lenoir Car Works and by various of the company's shops, will have another 1,000 cars repaired in like manner. It is hoped to have the work completed in time for the cars to be used in the fall crop movement.

IRON AND STEEL

THE PENNSYLVANIA has ordered 2,500 tons of steel for pier sheds at Greenville, N. J., from the McClintic-Marshall Company.

THE CHICAGO & NORTH WESTERN has ordered 228 tons of steel for the Webster avenue (Chicago) subway from the Chicago Bridge & Iron Company.

THE ALASKA ENGINEERING COMMISSION has ordered 5,000 tons of rails from the Colorado Fuel & Iron Company to be used on the main line of the government railroad from Seward, Alaska.

THE TOLEDO, ST. LOUIS & WESTERN has ordered 1,500 tons of rails from the Carnegie Steel Company, 1,000 tons of rails from the Lackawanna Steel Company and 500 tons from the Cambria Steel Company.

SIGNALING

THE GRAND TRUNK has contracted with the Federal Signal Company for the installation of a mechanical interlocking plant at the crossing of the Grand Trunk and the Canadian Pacific at Abbotsford, Quebec.

Supply Trade News

The Standard Steel Car Company is reported to be equipping its plant at New Castle to turn out a large order for shells.

The William Graver Tank Works, East Chicago, Ind., has received an order for three oil storage tanks from the Atchison, Topeka & Santa Fe. They will be erected at Silsbee, Brownwood and Cleburne, Tex.

The Chicago & North Western is in the market for 15,000 piles to be used in the foundation work for the new grain elevator to be erected at One Hundred and Eighteenth street and the Calumet river, Chicago, Ill.

The Pere Marquette has ordered 4,000 cross ties from the Indiana Tie Company, Evansville, Ind., and 1,000,000 feet of switch ties from the W. S. Mercereau Lumber Company, Parkersburg, W. Va. All of the material is for 1916 work.

Foster Milliken, formerly president of Milliken Brothers, Staten Island, N. Y., has been elected president of the McNab & Harlin Manufacturing Company, New York, manufacturers of brass, iron and steel valves, cocks and fittings.

President C. A. Starbuck, of the New York Air Brake Company, has announced that that company has closed a contract for an additional order for cartridge cases amounting to $3,675,000, bringing the total amount of orders now on the books for war material to $20,242,600.

R. W. Gillispie, New York district sales manager of the Pennsylvania Steel Company, has been appointed general manager of sales, succeeding John C. Jay, Jr., who has resigned from his position as vice-president and general manager of sales to become chairman of the Maxwell Motor Company.

The J. W. Murray Contracting Company, Kansas City, Mo., has been awarded the contract for building dikes for the St. Louis & San Francisco along the Trinity river, between Beaumont, Tex., and Houston; and has also received a contract from the Missouri, Kansas & Texas for work on the Brazos river, near Belasco, Tex.

The S. K. F. Ball Bearing Company was incorporated in Hartford, September 4, with $2,000,000 capitalization, to engage in the manufacture of ball bearings. The former American S. K. F. Ball Bearing Company has been a selling organization for the bearings made by the parent Swiss Company known as the Aktie Bolaget Svenska Kullagerfabriken of Gothenburg. The new company will build a factory at Hartford to manufacture bearings in this country, but the S. K. F. steel will be imported from Sweden.

The directors of the Westinghouse Electric & Manufacturing Company, at a meeting held on September 22, declared a quarterly dividend of 1½ per cent on the common stock, thus raising the annual dividend rate from 4 to 6 per cent. The income from purely domestic business during the last quarter was considered sufficient to warrant the 1½ per cent quarterly rate. The Westinghouse Company, according to a statement made by Chairman Guy E. Tripp, has received firm contracts for the manufacture of war supplies aggregating approximately $60,000,000, the greater portion of which is a contract for rifles, which is to be executed at factories in New England especially acquired for the purpose. This rifle business contributed nothing to the earnings for the quarter.

TRADE PUBLICATIONS

DEFEATING RUST.—The American Rolling Mill Company, Middletown, Ohio, has issued an attractive illustrated booklet giving the story of ingot iron, describing the qualities of this material, its method of manufacture, and the various uses to which it is adapted. The book is illustrated with a number of typical illustrations of these uses.

CENTRIFUGAL PUMPS.—Catalog H-2, recently issued by the Lea-Courtenay Company, Newark, N. J., describes and illus-

trates the various types and sizes of Lea-Courtenay centrifugal pumps. The booklet, containing 64 pages, is divided into 12 chapters, dealing respectively with the care taken in the manufacture of this company's product and the characteristics of the pump. The booklet is profusely illustrated.

SAND-BLAST APPARATUS.—The Mott Sand Blast Manufacturing Company, New York, has issued four folders dealing with the following sand-blast apparatus which it manufactures: the Mott direct-pressure sand-blast machine, hose type; the Mott sand-blast tumbling barrel; revolving table and cabinet, type G; the Mott type P. V. S. double sand-blast tumbling barrel and Mott sand-blast accessories.

RAILROAD SPECIALTIES.—The Q & C Company, New York, has issued an elaborate catalogue, illustrated in colors, describing its various products, including the Bonzano joint, the Vaughan rail anchor, tie plates and other track appliances, Ajax vestibule diaphragms, snow flangers and the Ross-Schofield system of circulation for locomotive boilers. The various features are illustrated in detail separately and in actual service.

STORAGE BATTERIES.—The Titan Storage Battery Company, Newark, N. J., has issued a very attractive catalogue relative to the company's line of storage batteries. The booklet touches upon the company itself and its aims, and treats of Titan storage batteries under the following heads: storage battery parts; elementary theory of the storage battery; Titan pasted plates, measurements, etc. Colored illustrations are given of the batteries and their parts.

THE RAILWAY RAIL.—The Pennsylvania Steel Company and the Maryland Steel Company are issuing a pamphlet describing in an interesting manner the origin and development of the railway rail, prepared by G. P. Raidabaugh. The various steps from the wooden tram rail of the seventeenth century to the 125-lb. Pennsylvania sections are described in detail with sketches. This book is valuable at this time of general interest in the steel-rail question.

STRUCTURAL STEEL BEAMS.—The Carnegie Steel Company, Pittsburgh, has issued a pamphlet on structural beams, second edition. This booklet gives dimensions and properties of a new standard of light, wide base I-beams, in sizes ranging from 8 in. to 27 in. It has been decided to roll these supplementary beams to meet a demand for beams of greater stiffness and smaller load-carrying capacity, which will be found suitable for use in certain classes of office buildings, light shop buildings and special classes of floor construction.

BALTIMORE & OHIO.—The historical booklet entitled "The Blue and the Gray," recently issued by the Baltimore & Ohio, is something unusual and interesting enough to deserve special mention. The folder contains 36 pages filled with an interesting description of the historic territory traversed by the lines of the railroad. The book, naturally, deals mainly with the civil war. It names the many points of interest from a historical standpoint and tells briefly what happened at each of these places. There is a chronological list of those battles of the civil war which occurred on or near the lines of the railroad and a map on which are designated the points at which these battles were fought.

DISTANT CONTROL ELIMINATES TRAIN STOPS.—This is the title given to Bulletin 131, recently issued by the General Railway Signal Company, Rochester, N. Y. The booklet deals with the operation of outlying passing siding switches by the G-R-S low voltage or "distant-control" switch machine, a device which was described in the *Railway Age Gazette* of March 19, 1915, page 678. The first installation of a low-voltage switch machine was in connection with a piece of single track on the Northern Pacific at Bozeman tunnel, Mont. This installation was described in detail in an article in the issue of April 16, page 831. The bulletin shows how distant-control eliminates train stops and notes the saving gained thereby. Besides containing a description and illustrations of the machine it also contains a number of wiring diagrams for different kinds of installations.

TRANS-AUSTRALIAN RAILWAY.—The work of constructing the Trans-Australian Railway, which will connect Western Australia with the Eastern States, is being pushed ahead at a good rate. The rails are now laid over a distance of 543 miles.

Railway Construction

AMERICUS, HAWKINSVILLE & EASTERN.—Arrangements have been made with western capitalists, it is said, to finance the construction of a line from Americus, Ga., northeast via Byromville to Hawkinsville, about 55 miles, and it is expected that the work will be started in October. J. S. Morton, Americus, president of the Georgia Lumber Company, may be addressed. (See Americus, Flint River & Gaines, July 2, page 38.)

CHARLESTON SOUTHERN.—Contracts are reported let by this company for work on the line to be built between Charleston, S. C., and Savannah, Ga., as follows: To the Gadsden Contracting Company, Savannah, a section of ten miles on the Savannah end of the line; to L. S. Wood, Gaffney, S. C., for work near Charleston and to M. Schiltz, Charlotte, N. C., for 12 miles south of this section. W. Z. Williams & Co., Macon, Ga., will fill in temporary trestles for 2 miles south of Ashepoo river and 2 miles north of Edisto river. (August 27, p. 409.)

FT. WAYNE, DECATUR & SOUTHERN.—Incorporated in Indiana with $10,000 capital to build an electric line between Ft. Wayne, Ind., Decatur, Monroe, Berne, Ceylon, Geneva, Bryant, Portland, Winchester, Lynn, Fountain City and Richmond. It is said that the company will take over the property of the Ft. Wayne & Springfield, which operates a line from Ft. Wayne south to Decatur, 21.6 miles. The incorporators include J. H. Koenig, C. Oetting, C. Dirkson and M. Gerke.

FT. WAYNE & SPRINGFIELD.—See Ft. Wayne, Decatur & Southern.

KANKAKEE & URBANA TRACTION.—Grading has been begun on the extension of this road from Ludlow, Ill., to Paxton, a distance of about five miles. The plans call for one bridge 90 ft. long, the contract for which has been let to the Central States Bridge Company, of Indianapolis, Ind.

OKLAHOMA UNION TRACTION.—See Tulsa Traction.

PHILADELPHIA ROADS.—Bids are wanted until October 19 by A. M. Taylor, director, department of city transit, Philadelphia, Pa., for the steel superstructure and appurtenant work for a two-track elevated railway on the following sections: in Front street on a section comprising about 4,074 linear ft., and another section of about 7,128 linear ft.; in Kensington avenue, on about 7,769 linear ft., and in Kensington avenue and Frankford avenue on about 7,653 linear ft. (July 23, page 182.)

PHOENIXVILLE, VALLEY FORGE & STRAFFORD ELECTRIC.—Plans have been made to build a seven-mile extension, it is said, from Valley Forge, Pa., east to a connection with the Philadelphia & Western at Bridgeport.

SOUTH SAN FRANCISCO RAILROAD & POWER CO.—This company will let a contract within 90 days for a half mile of grading between Holy Cross, Cal., and South San Francisco.

TEXAS & PACIFIC.—This company has under consideration plans for the construction of a branch line, it is said, to be built from either Big Springs, Tex., or Midland, northwest to Seminole.

TULSA (OKLA.) TRACTION.—This company was recently incorporated in Oklahoma with $100,000 capital, it is said, to succeed the Oklahoma Union Traction Company. A line will be built south of Tulsa, Okla., to Sapulpa and Okmulgee, and on the north to Collinsville. The company now operates six miles of single track to Orcutt Lake. G. C. Stebbins, president; and B. C. Redgreaves, superintendent.

RAILWAY STRUCTURES

BALTIMORE, MD.—The board of directors of the Baltimore & Ohio has authorized the construction of the large coal pier in the Curtis Bay terminal, Baltimore, and it is said that bids for the work will be asked for and the work started at once. The new pier will cost about $1,500,000. Its capacity will be 10,000,000 tons a year. It will be of steel 700 ft. long by 115 ft. wide. The breakage of coal will be overcome by means of a

system of belts which will be run at speeds varying from 250 ft. to 500 ft. a minute, leading to movable towers which will load into vessels on either side of the pier. The individual car dumpers will be able to handle cars 53 ft. long and will unload forty of the largest cars in one hour. (September 17, p. 548.)

Greenville, N. J.—The Pennsylvania Railroad has asked for bids on revised plans for the construction of a new pier at Greenville, N. J.

Johnstown, Pa.—The Pennsylvania Railroad has given a contract to W. H. Fissell & Co., New York, for building the superstructure of a new passenger station in Johnstown, Pa., to cost over $120,000. The building will be constructed of red tapestry brick and stone, and the interior will be finished in marble and tile. There will be two island platforms, each 900 feet long, from which access to the station will be by means of two tunnels, one for passengers and the other for baggage. The new station will be built just west of the present station. (December 4, p. 1068.)

Kinnickinnick, Wis.—The Barnett & Record Company, Minneapolis, Minn., has the contract for the erection of the superstructure of the 1,000,000-bu. elevator being built here by the Chicago & North Western. The elevator will be of reinforced concrete and steel construction and will cost in the neighborhood of $900,000.

Macon, Ga.—Bids are wanted by A. Fellheimer, architect, 7 East Forty-second street, New York, for building the union station to be used jointly by the Central of Georgia, the Southern Railway, and the Georgia Southern & Florida. The proposed structure is to be of stone, brick and steel construction. It will be three stories high, 80 feet wide and 250 feet long. The work is to be started in October and will cost about $500,000. (September 17, p. 548.)

Oelwein, Iowa.—The contract for the reconstruction of the Chicago Great Western storehouse, destroyed by fire the early part of August, has been let to the Blackhawk Construction Company, of Waterloo, Iowa. It will be a reinforced concrete structure. (August 20, p. 369.)

Oil City, Pa.—The Pennsylvania Railroad has submitted revised plans to the War Department for a railroad bridge to be built over the Allegheny river at Oil City.

Roanoke, Va.—The work now under way on an extension of the Norfolk & Western engine erecting shop at Roanoke, Va., is a continuation of the building begun in 1912, and extended a second time in 1914. The building is 110 ft. wide, 48 ft. high to the bottom of the trusses, and the present extension is to be 150 ft. long. It will have steel frame and trusses, slate roof, brick walls on one side, and galvanized siding above the level of the machine shop roof on the opposite side, at which point it will connect with the machine shop. The building will be equipped with crane runways for 100, 15, 10 and 5 ton cranes, which are now in use in the completed portion of the building. The new structure is to be used for building and repairing heavy locomotives and will replace the present brick building used for the same purpose. The Virginia Bridge & Iron Company, Roanoke, has the contract for furnishing and fabricating the steel work, and the Norfolk & Western forces have constructed the foundations and will erect the building. The improvements are to cost about $60,000, and the work will be finished this year. No new equipment will be required.

St. Joseph, Mo.—A comprehensive investigation of the grade crossings, terminal and depot facilities in this city is being made by a joint committee representing the Missouri Public Service Commission, the railways and the local Commerce Club.

Sunbury, Pa.—According to press reports the Philadelphia & Reading has adopted plans for building a railroad bridge over the Susquehanna river at Sunbury. The plans call for a 13-span steel girder bridge to carry single track. The new bridge is to be built to replace the light structure now in use.

Willow Springs, Mo.—The St. Louis & San Francisco has let the contract for a reinforced concrete coaling plant here to Fairbanks, Morse & Co. The plant will be of the "V" bucket type, will have 250-tons capacity, and will include a steam sand drier of one cubic yard capacity per hour.

Railway Financial News

Baltimore & Ohio.—Charles W. Harkness has been elected a director, succeeding Norman B. Ream, deceased.

Hudson & Manhattan.—The New York Public Service Commission, first district, has granted this company permission to issue $615,500 in bonds to reimburse the company for money expended in improving its plant, retiring underlying mortgages and for rolling stock. The bonds are to bear five per cent interest and run until February 1, 1957. There are to be sold to net the company not less than 80 per cent of the par value, and the order provides for the amortization during the life of the bonds of the discount and expense of sale.

Missouri Pacific.—A suit for foreclosure against this property was filed in the district court in St. Louis on September 19 by the Guarantee Trust Company of New York and B. F. Edwards of St. Louis.

New Jersey & Pennsylvania.—The property of this road was sold at auction September 21 to J. Irving Demarest, of Sewaren, N. J., owner of a quarry near the road at New Germantown. The line of the road extends from Morristown, N. J., southward 25 miles. No trains have been run for many months, the company being unable to keep the track in a condition fit for use. The price paid at this sale was said to be $29,000. The sale cannot be consummated until it has been approved by the Court, in whose hands the road is held.

New York, New Haven & Hartford.—Charles F. Brooker, Charles M. Pratt, Lewis Cass Ledyard, Henry K. McHarg and Frederick F. Brewster, former directors of this company, indicted and awaiting trial before the district court in New York for alleged violation of the anti-trust law, have petitioned the court for separate trials.

Pennsylvania Railroad.—This company on September 1, 1915, had an even 94,000 stockholders. This is an increase of 3,381 in a year, and is the largest number of stockholders ever reported for this or any other railroad in the world. Each stockholder on September 1 owned an average of 106.23 shares, or 3.96 shares less than the average holdings 12 months ago. Included in the total number of stockholders there were 45,428 women—1,743 more than last year—holding nearly a one-third interest in the property. Of the entire 94,000 stockholders 33,053 were in Pennsylvania, 16,024 lived in New York state, 16,366 in New England, 16,671 elsewhere in the United States and 11,886 in foreign countries. There were 62 more foreign stockholders on September 1, 1915, than on the same date in 1914, and 64 more than in July, 1914.

Virginia & Southwestern.—Robert L. Pennington, of Bristol, Tenn., has been elected a director to fill a vacancy.

The Busiest Passenger Station in England.—In an interview reported in a recent issue of the New York Times Magazine, H. W. Thornton, formerly general manager of the Long Island, and now general manager of the Great Eastern of England, made the statement that: "With one exception, and that is the St. Lazare station in Paris, there are more trains in and out of the Liverpool street station, which is the London terminus of the Great Eastern system, than any other railway station in the world. The Great Eastern serves territory generally known as East Anglia, but there are other roads also touching this section, which in a sense gives the Great Eastern some competition, though upon the whole, it has the eastern counties to itself. From 6 o'clock in the morning to 9:30, also of the morning, there are 278 trains arriving in the Liverpool street station, and the number of passengers alighting therefrom during these three hours and a half is about 75,000. During the entire 24 hours there are almost 700 trains arriving in the station, and about the same number departing therefrom, making a grand total of trains in and out of the station every 24 hours of about 1,400. So you see it requires the highest efficiency in the staff and the working force of the road to care for so many trains, so close to one another, to insure safety and promptness."